50272-101

REPORT DOCUMENTATION PAGE	1. REPORT NO.	2.	3. Recipient's Accession No. PB-94-161098
4. Title and Subtitle: Updating the Geographic Practice Cost Index: The Practice Expense GPCI FINAL REPORT and APPENDICES TO FINAL REPORT			5. Report Date: May 1994 (Revised) 6.
7. Author(s): Gregory C. Pope; Debra A. Dayhoff; John E. Schneider; Angela R. Merrill and Killard W. Adamache; Stephen Zuckerman			8. Performing Organization Rept. No.
9. Performing Organization Name and Address: Health Economics Research, Inc. 300 Fifth Avenue 6th Floor Waltham, MA 02154			10. Project/Task/Work Unit No. 11. Contract(C) or Grant(G) No. (C) 500-89-0050.5 (G)
12. Sponsoring Organization Name and Address: Health Care Financing Administration 2-B-14 Oak Meadows Bldg. 6325 Security Blvd. Baltimore, MD 21207			13. Type of Report & Period Covered: Final 14.

15. Supplementary Notes

See also PB94-161072; PB94-161080; and PB94-161106. This study supports the Notice of Proposed Rule Making (BPD-789-P) "Medicare Program Refinements to the Physician Fee Schedule Geographic Factor Values and Other Changes", forthcoming in the Federal Register in June 1994.

16. Abstract (Limit: 200 words)

The Omnibus Budget Reconciliation Act (OBRA) of 1989 reformed Medicare payment for physician services as of January 1, 1992. On that date, Medicare began paying physicians on the basis of a national Medicare Fee Schedule (MFS) instead of usual, customary, and reasonable charges. Payments to physicians are now calculated from national uniform relative values and various conversion factors adjusted for justifiable geographic differences in physicians' cost of practice using a geographic adjustment factor termed the Medicare Geographic Practice Cost Index (GPCI). Subsequently, OBRA 1990 required that the GPCI be reviewed periodically and revised as necessary. The subject study supported HCFA's review of the original GPCIs; assessed the Medicare practice expense GPCI (PEGPCI) in effect from 1992-1994; and recommended a number of alternatives that might be used to update the PEGPCI. The report consists of three parts --Part I the employee wage index, Part II the office rental index, and Part III supplies, equipment, and miscellaneous expenses. Study recommendations for the wage index component are to use median hourly 1990 Census earnings for selected occupations, for counties within large metropolitan areas. For the office rental index use the FY 1994 Housing and Urban Development Fair Market Rent values, modified by county-specific rather than metropolitan rents in consolidated metropolitan areas. For miscellaneous, equipment, and supplies no new data sources were found, thus, the current policy of no geographic variation was ratified. Relative value (RV) weighting and rescaling for Medicare budget neutrality (factor 1.00125) were incorporated into the final values. The extensive Appendixes include IV-1 the population versus RV weighting analysis; IV-2 the 1996 PEGPCI, the 1996 rescaled PEGPCI, the 1995 rescaled PEGPCI, the 1992 (1992-1994) current PEGPCI by Medicare payment locality; IV-3 ranks the Medicare payment localities in order of descending difference between the 1996 rescaled PEGPCI and the 1992 (current) PEGPCI.

17. Document Analysis a. Descriptors

-

b. Identifiers/Open-Ended Terms

Medicare physician payment; practice expense; Geographic Practice Cost Index; PEGPCI; Laspeyres input price index; Medicare Fee Schedule; MFS; Geographic Adjustment Factor; GAF; employee wage index; office rent index; and supplies, equipment, and miscellaneous prices.

c. COSATI Field/Group

18. Availability Statement: Release Unlimited	19. Security Class (This Report): UNCLASSIFIED	21. No. of Pages: 168 Final Rpt 79 Appendices
	20. Security Class (This Page): UNCLASSIFIED	22. Price

(See ANSI-Z39.18) See Instructions on Reverse OPTIONAL FORM 272 (4-77) (Formerly NTIS-35)

HER HEALTH ECONOMICS RESEARCH, INC.

300 Fifth Avenue, 6th Floor
Waltham, MA 02154
(617) 487-0200
(617) 487-0202 Fax

UPDATING THE GEOGRAPHIC PRACTICE COST INDEX:

THE PRACTICE EXPENSE GPCI

Final Report

Submitted by:

Gregory C. Pope, M.S.
Debra A. Dayhoff, Ph.D.
Killard W. Adamache, Ph.D.
John E. Schneider, M.A.
Angela R. Merrill, B.A.

Health Economics Research, Inc.

and

Stephen Zuckerman, Ph.D.

The Urban Institute
2100 M Street, N.W.
Washington, DC 20037

May 1994

This report was prepared under Contract No. 500-89-0050 from the Health Care Financing Administration to Health Economics Research, Inc. The assistance of our HCFA Project Officer, Sherry Terrell, Ph.D., is gratefully acknowledged. The statements contained in this report are solely those of the authors and do not necessarily reflect the views or policies of the Health Care Financing Administration. The contractor assumes responsibility for the accuracy and completeness of the information contained in this report.

TABLE OF CONTENTS

PAGE

EXECUTIVE SUMMARY ES-1

INTRODUCTION I-1

PART I: EMPLOYEE WAGE INDEX

1.0 INTRODUCTION I-1-1
1.1 Background on the Employee Wage Index I-1-1
1.2 Criticisms of the Employee Wage Index I-1-1
1.3 Overview of Part I of the Report I-1-2

2.0 DATA FOR THE EMPLOYEE WAGE INDEX I-2-1
2.1 Description of Census Data I-2-1
2.2 Sample Sizes of Census Data I-2-1

3.0 METHODS FOR COMPUTING NON-PHYSICIAN EMPLOYEE WAGE I-3-1
3.1 Occupation Shares for Employee Occupations I-3-1
3.1.1 Data Source I-3-1
3.1.2 Computation I-3-2
3.1.3 Comparison with Current Shares I-3-2
3.1.4 Validation Versus AMA SMS Shares I-3-4
3.2 Non-Physician Employee Wage Indexes I-3-4
3.2.1 Create County File of Wages for Occupation Categories I-3-4
3.2.2 Calculate County Index I-3-6
3.2.3 Translate County Index to Medicare Payment Localities I-3-6

4.0 ALTERNATIVE NON-PHYSICIAN EMPLOYEE WAGE INDEXES I-4-1
4.1 Updating With 1990 Census Data I-4-1
4.2 Non-Manufacturing Administrative Support Staff Wages I-4-4
4.3 County-Specific Wages in CMSAs I-4-6
4.4 Mean Earnings I-4-8
4.5 Comparison to the PPS Hospital Wage Index I-4-11

5.0 FINAL EMPLOYEE WAGE INDICES I-5-1

PART II: OFFICE RENTAL INDEX

1.0 INTRODUCTION II-1-1
1.1 Background on the Office Rental Index II-1-1
1.2 Criticisms of the Rental Index II-1-1
1.3 Overview of Part II of the Report II-1-2

2.0 REVIEW OF DATA SOURCES FOR OFFICE RENTAL INDEX II-2-1
2.1 Previous Data Searches II-2-1
2.2 Review of Private Sources of Commercial Office Rents II-2-2
2.2.1 Building Owners and Managers Association II-2-2
2.2.2 Institute of Real Estate Management II-2-3
2.2.3 Society of Industrial and Office Realtors II-2-5

TABLE OF CONTENTS (continued)

PAGE

2.2.4 The Urban Land Institute II-2-5
2.2.5 Limitations of Private Commercial Rental Data II-2-5
2.3 Internal Revenue Service Tax Returns II-2-7
2.4 General Services Administration Rental Survey II-2-8
2.5 U.S. Post Office Rental Data II-2-9
2.6 Department of Housing and Urban Development (HUD) Fair Market Rents (FMRs) II-2-10
2.6.1 General Description II-2-10
2.6.2 Strengths of the FMRs for the GPCI Rental Index II-2-11
2.6.3 Weaknesses of the FMRs for the GPCI II-2-11
2.6.4 Effect of Residential Rent Control on the FMRs II-2-13
2.7 Primary Data Collection II-2-14
2.8 Conclusions on Data for the Office Rental Index II-2-16

3.0 ALTERNATIVE OFFICE RENTAL INDICES II-3-1
3.1 Rationale for Office Rental Index Alternatives II-3-1
3.1.1 Most Recent Single Year II-3-1
3.1.2 Three Year Average II-3-1
3.1.3 County-Specific Rents in CMSAs II-3-2
3.1.4 Two Versus Four Bedroom FMRs II-3-2
3.2 Methods Used to Calculate Alternative Office Rental Indices II-3-3
3.2.1 Create County File of FMRs II-3-3
3.2.2 Replace New York City FMR II-3-4
3.2.3 Calculate County FMR Index II-3-4
3.2.4 Translate County Index to Medicare Payment Localities II-3-5
3.2.5 Create County-Specific Rents in CMSAs II-3-5
3.3 Changes in the Office Rental Index From Updating II-3-6
3.3.1 Single Most Recent Year: FY 1993 FMRs II-3-6
3.3.2 Three Year Average: FY 1993, 1992, 1991 FMRs II-3-9
3.3.3 County-Specific Rents in CMSAs II-3-9
3.3.4 Two Bedroom Versus Four Bedroom FMRs II-3-14

4.0 NEW YORK CITY AREA OFFICE RENTAL INDICES II-4-1
4.1 Evidence From Physician Surveys II-4-2
4.2 Apartment Rents by County in the New York Metropolitan Area II-4-4
4.3 Office Rental Indices for New York City Area Localities II-4-4

5.0 VALIDATION OF OFFICE RENTAL INDEX USING PHYSICIAN SURVEY DATA II-5-1
5.1 Previous Validations II-5-1
5.2 Validation using the PPCIS II-5-3
5.2.1 Data Description II-5-3
5.2.2 Descriptive Results II-5-4
5.2.3 Regression Results II-5-7
5.2.4 Variation in Costs After Adjusting for the GPCI II-5-12
5.2.5 Conclusion II-5-12

6.0 FINAL OFFICE RENTAL INDICES II-6-1

REFERENCES

TABLE OF CONTENTS (continued)

PAGE

PART III: SUPPLIES, EQUIPMENT, AND MISCELLANEOUS PRICES

1.0 INTRODUCTION **III-1-1**
1.1 Overview of Part III of the Report III-1-1

2.0 INPUT PRICE DATA **III-2-1**
2.1 Secondary Data III-2-1
2.1.1 Review of Previous Searches for Secondary Data III-2-2
2.1.2 Results of HER Search Efforts III-2-4
2.1.3 Conclusions III-2-9
2.2 Primary Data Collection III-2-10
2.2.1 Design Issues for a Survey of Input Prices III-2-10
2.2.2 Types of Primary Surveys III-2-12
2.3 Concluding Comments III-2-12

3.0 ANALYSIS OF PHYSICIAN SURVEY DATA **III-3-1**
3.1 Review of Previous Studies III-3-1
3.1.1 AMA Study III-3-1
3.1.2 Urban Institute Study III-3-2
3.1.3 Limitations of Using Expenditure Data to Infer Input Price Variation III-3-3
3.2 Analysis of PPCIS Practice Costs and Equipment Prices III-3-5
3.2.1 Description of the 1988 Physicians' Practice Costs and Income Survey III-3-5
3.2.2 Methods III-3-6
3.2.3 Geographic Variation in Practice Costs and Equipment Prices .. III-3-8
3.2.4 Correlation with Other GPCI Input Price Measures III-3-15
3.2.5 Conclusions III-3-17

4.0 CONCLUSIONS FOR POLICY **III-4-1**
4.1 Effect of Hypothetical Supplies, Equipment, and Miscellaneous Price Variation on the Geographic Adjustment Factor (GAF) III-4-1
4.2 Policy Options III-4-3
4.3 Primary Data Collection in the Long Run III-4-4

REFERENCES

PART IV: THE PRACTICE EXPENSE GPCI IV-1

TABLE OF TABLES

PAGE

PART I: EMPLOYEE WAGE INDEX

TABLE 2-1 DISTRIBUTION OF 1990 CENSUS SAMPLE SIZES FOR EMPLOYEE OCCUPATION GROUPS, BY MEDICARE PAYMENT LOCALITY I-2-2

TABLE 3-1 OCCUPATIONAL EXPENDITURE SHARES FOR THE EMPLOYEE WAGE INDEX I-2-3

TABLE 4-1 MEDICARE PAYMENT LOCALITIES EXPERIENCING LARGE CHANGES IN THE EMPLOYEE WAGE INDEX AS A RESULT OF UPDATING WITH 1990 CENSUS DATA I-4-2

TABLE 4-2 MEDICARE PAYMENT LOCALITIES EXPERIENCING THE LARGEST CHANGES IN THE EMPLOYEE WAGE INDEX AS A RESULT OF USING WAGES OF NON-MANUFACTURING INDUSTRY CLERICAL WORKERS I-4-5

TABLE 4-3 MEDICARE PAYMENT LOCALITIES EXPERIENCING LARGE CHANGES IN THE EMPLOYEE WAGE INDEX AS A RESULT OF USING COUNTY LEVEL DATA WITHIN CMSAS I-4-7

TABLE 4-4 MEDICARE PAYMENT LOCALITIES EXPERIENCING LARGE CHANGES IN THE EMPLOYEE WAGE INDEX AS A RESULT OF USING MEAN RATHER THAN MEDIAN EARNINGS I-4-9

TABLE 4-5 MEDICARE PAYMENT LOCALITIES WITH LARGE DIFFERENCES BETWEEN THE GPCI EMPLOYEE WAGE INDEX AND THE PPS WAGE INDEX I-4-13

PART II: OFFICE RENTAL INDEX

TABLE 2-1 MEAN OFFICE RENT IN DOLLARS PER SQUARE FOOT, 1991: SELECTED AREAS II-2-4

TABLE 3-1 LOCALITIES EXPERIENCING LARGE CHANGES IN OFFICE RENTAL INDEX AS A RESULT OF USING 1993 FAIR MARKET RENTS (FMRs) II-3-7

TABLE 3-2 LOCALITIES EXPERIENCING LARGE CHANGES IN OFFICE RENTAL INDEX AS A RESULT OF USING A BLEND OF 1987 AND 1993 FAIR MARKET RENTS (FMRs) II-3-10

TABLE 3-3 LOCALITIES EXPERIENCING LARGE CHANGES IN OFFICE RENTAL INDEX AS A RESULT OF USING A BLEND OF 1991, 1992, AND 1993 FAIR MARKET RENTS (FMRs) II-3-11

TABLE OF TABLES (continued)

		PAGE
TABLE 3-4	LOCALITIES EXPERIENCING LARGE CHANGES IN OFFICE RENTAL INDEX AS A RESULT OF USING COUNTY-SPECIFIC RENTS, 1993	II-3-13
TABLE 3-5	LOCALITIES WITH THE LARGEST DIFFERENCES BETWEEN OFFICE RENTAL INDICES BASED ON TWO- AND FOUR-BEDROOM FAIR MARKET RENTS (FMRs)	II-3-15
TABLE 4-1	NEW YORK CITY AREA MEDIAN PHYSICIAN OFFICE COST PER SQUARE FOOT: PHYSICIAN PRACTICE COST AND INCOME SURVEY, 1988	II-4-3
TABLE 4-2	NEW YORK CITY AREA MEDIAN PHYSICIAN OFFICE EXPENSES PER SQUARE FOOT: AMA DATA, 1991, 1990	II-4-5
TABLE 4-3	COUNTY-SPECIFIC APARTMENT RENTS FOR THE NEW YORK CITY PMSA	II-4-6
TABLE 4-4	OPTIONS FOR UPDATED NEW YORK CITY AREA OFFICE RENTAL INDICES	II-4-8
TABLE 5-1	COMPARISON OF PHYSICIAN OFFICE EXPENSE PER SQUARE FOOT TO FAIR MARKET APARTMENT RENTS	II-5-6
TABLE 5-2	REGRESSIONS OF PPCIS COST PER SQUARE FOOT ON GPCI OFFICE RENTAL INDEX	II-5-9
TABLE 5-3	ELASTICITY ESTIMATES FOR SUBGROUPS FROM REGRESSION OF PPCIS EXPENSE PER SQUARE FOOT ON GPCI INDEX OFFICE RENTAL	II-5-10
TABLE 5-4	TESTS FOR VARIATION IN GPCI ADJUSTED EXPENSE PER SQUARE FOOT	II-5-13

PART III: SUPPLIES, EQUIPMENT, AND MISCELLANEOUS PRICES

TABLE 3-1	NUMBER OF VALID OBSERVATIONS IN PPCIS EQUIPMENT SUPPLEMENT	III-3-7
TABLE 3-2	MEDIAN EQUIPMENT PURCHASE PRICES BY CENSUS REGION AND URBANICITY	III-3-9
TABLE 3-3	PRACTICE EXPENSE REGRESSIONS	III-3-12
TABLE 3-4	ELECTROCARDIOLOGY EQUIPMENT (EKG) PRICE REGRESSIONS	III-3-13

TABLE OF TABLES (continued)

		PAGE
TABLE 3-5	F TESTS ON GEOGRAPHIC VARIABLES IN EXPENSE/PRICE REGRESSIONS	III-3-14
TABLE 3-6	ELASTICITIES OF GPCI PRICE INDICES IN EXPENSE/PRICE REGRESSIONS	III-3-16
TABLE 4-1	EFFECTS ON GAF OF HYPOTHETICAL VARIATION IN SUPPLIES, EQUIPMENT, MISCELLANEOUS INPUT PRICES	III-4-2

EXECUTIVE SUMMARY

ES1.0 THE PRACTICE EXPENSE GPCI

The Geographic Practice Cost Index (GPCI) is an input price index used to adjust Medicare Fee Schedule payments for geographic variations in physicians' practice costs. The GPCI has three components: physician work, practice expense, and malpractice insurance. The practice expense GPCI, in turn, has three components:

1. nonphysician employee wages;
2. office rent; and
3. supplies, equipment, and miscellaneous inputs.

The Health Care Financing Administration contracted with Health Economics Research, Inc. to update the GPCI. This report analyzes alternatives for updating the current (1992) practice expense GPCI with 1990 Census and other data. Companion reports discuss updating the physician work and malpractice GPCIs. In this Executive Summary, we first discuss updating the cost shares used to combine the three components of the practice expense GPCI, then we discuss updating each of the component indices, and finally, the effect of updating on the entire index.

ES2.0 PRACTICE EXPENSE COST SHARES

The three component indices of the practice expense GPCI are combined into an overall index using the average shares of each of the three cost categories--employee wages; office rent; and supplies, equipment, and miscellaneous--in physician practice expenses. Cost shares for the updated (1996) GPCI are discussed in detail in a companion report (Dayhoff, Schneider, and Pope, 1994). There it is concluded that the GPCI should utilize the same cost shares as the most recent Medicare Economic Index (MEI), which are derived from 1989 American Medical Association Socioeconomic Monitoring System survey data on physician practices. The MEI cost shares for practice expense are: 39.8% for employee wages, 25.1%

for office rent, and 35.1% for supplies, equipment, and miscellaneous.[1] Thus, the 1996 practice expense GPCI (GPCIPE96) is computed as:

$$GPCIPE96 = 0.398*EMPWAGE + 0.251*OFFRENT + 0.351*SEM,$$

where

EMPWAGE = index of nonphysician employee wages;
OFFRENT = index of office rental prices; and
SEM = index of supplies, equipment, and miscellaneous prices.

ES3.0 EMPLOYEE WAGE INDEX

The practice expense GPCI employee wage index measures the relative wages in different areas of nonphysician employees in physician offices. The 1992 GPCI employee wage index was computed from 1980 Census earnings data; the updated (1996) GPCI employee wage index is computed from 1990 Census data. Employees are grouped into the following categories, which are shown with their estimated share of the total physician payroll:[2]

Occupational category	1992 GPCI share	1996 GPCI share
Clerical workers	60.4%	44.8%
Registered nurse	20.4%	25.1%
Licensed practical nurses	6.9%	9.2%
Health technicians	12.3%	20.9%.

[1]The corresponding shares for the 1992 practice expense GPCI, based on 1987 AMA SMS data, are: 39.1%, 27.6%, and 33.3%, respectively. Hence, the share of office rent in practice expense has fallen whereas the shares of employee wages, and especially supplies, equipment, and other, have risen.

[2]The 1992 GPCI shares are estimated from the 1980 Census and the 1983 HCFA Physician Practice Cost and Income Survey; the 1996 GPCI shares are estimated from the 1990 Census and the 1988 HCFA Physician Practice Cost and Income Survey.

The nurse and technician categories have gained substantially at the expense of clerical workers in their share of physician office payroll, primarily because the 1996 shares are weighted by practice size whereas the 1992 shares were not.

A wage index is produced for each of the four employee occupational categories, then combined into the overall wage index using the shares shown in the table. We considered four options for computing the wage indices from 1990 Census data:

1. no change in method of computation from the 1992 practice expense GPCI employee wage index;

2. use earnings of non-manufacturing clerical workers rather than clerical workers in all industries;

3. use mean rather than median hourly earnings; and

4. use county-specific, rather than metropolitan-wide earnings for large metropolitan areas.

Using wages of non-manufacturing rather than all clerical workers results in very minor changes in the employee wage index, which we judged to be too insignificant to warrant changing the method of computation. Using mean rather than median earnings resulted in somewhat larger, but still minor, changes in the index. We prefer median earnings because of its lesser sensitivity to the extremes of the earnings distribution, or to anomalous data. Although the employee wage index is also not greatly affected by using county-specific data within large metropolitan areas, we believe that this is a justifiable change in the method of computing the index. Several populous central city localities (e.g., Manhattan, San Francisco) benefit from this change. We believe this is appropriate because physicians in fact have to pay higher wages to attract employees in these localities than in outlying parts of their metropolitan areas.

The Health Care Financing Administration concurred with our recommendations concerning the employee wage index. The index used in the 1996 practice expense GPCI is based on the median hourly earnings of clerical workers, registered nurses, licensed practical nurses, and health technicians as measured from the 1990 Census. Earnings are measured for counties within large metropolitan areas.

In addition, the updated employee wage index is weighted by practice expense RVUs rather than by population. The reasons for weighting by RVUs are twofold. First, RVUs (which are available by county of location of service) provide a better indication of where services are provided. The GPCI should be weighted to reflect input prices at these locations. Second, weighting by RVUs guarantees that total Medicare Fee Schedule (MFS) payments for practice expense will not change if the payment localities are revised (e.g., if a state with multiple payment localities becomes a single statewide locality). Appendix I-2 shows the (minor) differences between the 1996 RVU and population weighted employee wage index.

The differences between the 1996 practice expense GPCI employee wage index and the 1992 practice expense GPCI employee wage index are the use of 1990 rather than 1980 Census data, county-specific earnings in large urban areas rather than metropolitan area earnings, weighting by RVUs rather than population, the classification of all workers by place of work rather than some by place of residence,[3] and the use of the Office of Management and Budget's June 1993 metropolitan area redefinitions.[4] Appendix I-3 shows the 1996 employee wage index, the rescaled 1996 employee wage index, and the 1992 employee wage index by Medicare payment locality. The rescaled index is multiplied by the factor 1.00125, which was derived by HCFA actuaries to ensure that total Medicare Fee Schedule payments for practice expense do not change when the GPCI is updated. The rescaled index will be proposed for use in the practice expense GPCI beginning in 1996.

Appendix I-4 ranks Medicare payment localities in descending order of difference between the 1996 rescaled employee wage index and the 1992 employee wage index. The changes from updating are significant. Twenty seven of the 216 localities experience more than a 5 percentage point increase and 79 experience more than a 5 percentage point decrease in their index values. The largest increase is 24 percentage points, for South Central Connecticut; the largest decrease is 18 percentage points, for Peoria, Illinois. Many of the largest gainers are in New England, and many of the largest losers are in the Midwest. It should be remembered, however, that the employee wage index accounts for only about 16

---

[3]In the 1992 GPCI, for sample size reasons, place of work classification was only used in large metropolitan areas. In other areas, workers were classified by their place of residence.

[4]Although the GPCI is eventually calculated for Medicare payment localities, the Census Bureau tabulates the underlying earnings data for metropolitan areas and the nonmetropolitan portions of states before it is crosswalked to localities.

percent of the overall Medicare Geographic Adjustment Factor (GAF). Thus, even the largest changes in the employee wage index imply less than a 4 percent change in Medicare fees in any payment locality.

ES4.0 OFFICE RENTAL INDEX

The office rental index of the practice expense GPCI measures the relative price of office space in different areas. Because of the unavailability of valid and reliable physician or commercial office rental data for each physician payment locality, relative residential apartment rents have been used to proxy relative physician office rents in the GPCI. The residential rental data employed is the "Fair Market (Apartment) Rents" (FMRs) established by the Department of Housing and Urban Development (HUD) for use in the Section 8 rental subsidy program. The current (1992) MFS practice expense GPCI uses 1987 FMRs. An adjustment for New York City was made because residential rent control may make relative residential rents inaccurate measures of relative commercial rents in New York City. The New York City FMR was replaced with the FMR of Bergen-Passaic, New Jersey.

We analyzed the following issues in the course of updating the GPCI office rental index:

1. data sources available to measure rents;
2. basing the index on the most recent single year of data versus a three year average;
3. county-specific rather than metropolitan-wide rents in large urban areas; and
4. rental indices for the New York City area.

Based on our survey of available data on rents, we conclude that the HUD FMRs remain the best source of data on which to base the GPCI office rental index. We believe that the FMRs provide an acceptable measure of relative office rental costs, unlike any other data source. Primary data collection of office rents has the potential to provide a more accurate measure, but a survey of commercial rents would be quite expensive, and would need to be conducted on an ongoing basis.

The updated 1996 GPCI office rental index could be based on the most recent available year of FMRs, or on a multi-year average. A three year average, for example, smooths out some of the year to year fluctuations in the FMRs. We recommend that the most recent year of FMRs be used in the GPCI. These data are HUD's best estimates of current rental market conditions. Moreover, Congress has mandated a two-year transition period when the GPCI is updated, which will help smooth fluctuations. The updated 1996 office rental index is based on the final fiscal year 1994 FMRs, which incorporate HUD's benchmark revision based on the 1990 Census, and incorporate OMB's June 1993 metropolitan area definitions.

We found that rents do vary systematically within large metropolitan areas. Thus, we recommend that county-specific rental data, rather than metropolitan-area-wide data, be used in large urban areas. Because HUD does not publish county rents within metropolitan areas (MSAs), we used a special tabulation of rents reported on the 1990 Census to develop relative rental factors for counties within large metropolitan areas (defined as Consolidated MSAs, or CMSAs).[5] This special tabulation was requested from the Census Bureau by HUD, and is consistent with the data HUD uses in establishing its FMRs.

There are two issues in establishing office rental values for New York City: (1) the average rental value for the city, and (2) relative rents in the different New York City boroughs (counties). The FMRs could be biased down as a measure of relative New York City commercial rents because of residential rent control in the city. However, available studies find only a small effect of rent control on median apartment rents in New York City, indicating that using the actual HUD FMR for New York City in the GPCI is justifiable. The special tabulation of Census data, however, indicates considerable variation in rents within New York City, in particular, that rents in Manhattan are much higher than in the other boroughs. Since Manhattan is a distinct Medicare payment locality, its higher rents should be recognized. This can be accomplished by utilizing county-specific rents within the New York City CMSA, as we recommend.

After reviewing our analyses, HCFA decided that the office rental index of the 1996 practice expense GPCI should be based on the fiscal year 1994 HUD FMRs, adjusted by

---

[5]The special tabulation is used only to establish relative rental factors for CMSA counties. The fiscal year 1994 metropolitan average FMR published by HUD for Primary MSAs is maintained in the 1996 GPCI office rental index.

county-specific rental factors within large metropolitan areas (CMSAs) derived from HUD's special tabulation of 1990 Census rental data. New York City area rental indices are based on actual HUD FMRs, adjusted by the county-specific rental factors. Additionally, for the reasons given in Section ES3.0, the office rental index is weighted by practice expense RVUs rather than by population. Appendix II-2 shows the minor differences between the 1996 RVU- and population-weighted indices.

Appendix II-3 shows the 1996 office rental index, the rescaled 1996 office rental index, and the 1992 office rental index by Medicare payment locality. The rescaled index is multiplied by the factor 1.00125, which was derived by the HCFA actuaries to ensure that total Medicare Fee Schedule payments for practice expense do not change when the GPCI is updated. The rescaled index will be proposed for use in the practice expense GPCI beginning in 1996.

Appendix II-4 ranks Medicare payment localities in descending order of difference between the 1996 rescaled office rental index and the 1992 office rental index. The changes from updating are significant. Twenty of the 216 Medicare payment localities gain more than 10 percentage points and 55 lose more than 10 percentage points. The largest gainer is Hawaii, whose index rises 52 percentage points, or 41 percent. The largest loser is Victoria, Texas, which loses 38 percentage points. Nevertheless, it should be remembered that the office rental index accounts for only approximately 10 percent of the overall MFS GAF. Hence, even the largest changes in the office rental index imply a gain or loss of less than 5 percent in the total Medicare fee.

ES5.0 SUPPLIES, EQUIPMENT AND MISCELLANEOUS PRICES

Medical supplies, medical equipment, and miscellaneous practice costs comprise about one-third of the practice expense GPCI. In the current (1992) GPCI, no adjustment is made for geographic variation in the prices of these practice inputs. It has been assumed that physicians everywhere could purchase supplies, equipment, and miscellaneous inputs in national markets at the same price. However, no data has been located to verify this assumption.

We reevaluated geographic variation in the prices of medical supplies, equipment, and miscellaneous inputs through the following activities:

- review of previous studies;
- search for information on geographic variation in prices;
- interviews of manufacturers, distributors, wholesalers, and purchasers of medical supplies and equipment;
- analysis of shipping costs;
- analysis of HCFA's 1988 Physician Practice Cost and Income Survey;
- simulations of the effect of hypothetical input price variation on the overall GAF; and
- evaluation of the benefits and costs of primary data collection of prices by area.

We concluded that there is currently no data available that is adequate to determine geographic variation in medical supply, equipment, and miscellaneous input prices. Analysis of physician practice expense data and interviews with manufacturers, distributors, and purchasers do not clearly establish a geographic pattern of variation in prices. Generally, it appears that manufacturers charge uniform prices, aside from shipping costs. Distributors' (wholesalers') prices may vary because of local costs of doing business and competitive conditions. Larger physician groups are likely to be able to buy through national distributors with uniform prices, again aside from shipping costs. Solo practitioners and small group physicians are more likely to buy from local distributors with varying prices. Larger groups are also likely to receive volume discounts. Shipping costs to Alaska, Hawaii, and Puerto Rico appear to be higher than to mainland United States destinations, but no data are available on specific differentials between locations of manufacturers/suppliers/distributors and physician practices in outlying areas. Shipping costs to rural areas do not appear to be higher than to nearby urban areas.

Simulations show that because of the small share of supplies, equipment, and miscellaneous in the overall GAF (about 14 percent), moderate price variation in these inputs has little effect on the GAF. If the prices of all three inputs varied by as much as 20 percent below the national average to 20 percent above the national average across Medicare payment localities, the GAF would only change by plus or minus 2.8 percent. Moreover, large price differences across areas seem unlikely because supplies and equipment are

physical products that can be transshipped in response to regional price differentials. The miscellaneous category is composed of many inputs whose geographic price differences may not be highly correlated, limiting the price variation of the overall miscellaneous category. To develop a measure of geographic differences in supplies, equipment, and miscellaneous prices, an expensive primary data collection effort would be necessary. Improvements in the GPCI resulting from primary data collection are likely to be small, both because of the small share of these inputs in the GAF, and because their price variation is likely to be limited.

Given these considerations, HCFA decided to maintain a policy of no geographic adjustment for supplies, equipment, and miscellaneous prices in the GPCI. Thus, this portion of the practice expense GPCI is simply 1.000 (i.e., the national average) everywhere.

ES6.0 THE UPDATED PRACTICE EXPENSE GPCI

We now discuss the overall 1996 practice expense GPCI, which is the weighted sum of its three component indices--employee wages, office rents, and supplies, equipment, and miscellaneous prices[6]--as given by the formula in Section ES2.0. The 1996 practice expense GPCI is weighted by practice expense RVUs (rather than population), reflects OMB's June 1993 metropolitan area redefinitions, and captures county-specific price variation within large metropolitan areas (CMSAs). These are all features--in addition to its use of more recent input price data--that distinguish the 1996 practice expense GPCI from the 1992 practice expense GPCI. Of these changes, the use of more recent input price information has by far the largest overall impact on the index values of Medicare payment localities. Appendix IV-1 shows that weighting the practice expense GPCI by RVUs versus population has only a minor effect on the index values of Medicare payment localities.

Appendix IV-2 displays the 1996 practice expense GPCI, the 1996 rescaled practice expense GPCI, the 1995 rescaled practice expense GPCI, and the 1992 practice expense GPCI by Medicare payment locality. HCFA actuaries developed a multiplicative factor (1.00125) that was used to ensure that total Medicare Fee Schedule payments for practice expense are not affected by the updated practice expense GPCI. The 1996 rescaled GPCI reflects this

[6]The supplies, equipment, and miscellaneous price index is 1.0 everywhere.

factor. This rescaled GPCI will be used for payment beginning in 1996. The 1995 rescaled GPCI is the simple average of the 1996 rescaled GPCI and the 1992 GPCI. The 1995 rescaled GPCI will be used for payment in 1995 only.

Appendix IV-3 ranks the Medicare payment localities in order of descending difference between the 1996 rescaled practice expense GPCI and the 1992 practice expense GPCI. The changes in the practice expense GPCI index values from updating (1996 versus 1992 GPCI) are moderate. The largest increase is 12 percent, in Southwest Connecticut. Only three payment localites gain more than 10 percent. The largest loss is also 12 percent, in Peoria, Illinois. Only three localites lose more than 10 percent. The practice expense GPCI comprises 41 percent of the overall Medicare Fee Schedule Geographic Adjustment Factor (GAF). Therefore, Medicare fees for a typical service will change by less than 5 percent in any area due to updating the practice expense GPCI. Moreover, Congress has mandated a two-year transition from the 1992 to the 1996 GPCIs. The change in the 1995 transitional GPCI is only half as large as the already small difference between the 1996 and 1992 GPCIs.

UPDATING THE GEOGRPAHIC PRACTICE COST INDEX: THE PRACTICE EXPENSE GPCI

1.0 INTRODUCTION

1.1 Background on the Practice Expense GPCI

The Geographic Practice Cost Index (GPCI) is used in adjusting Medicare Fee Schedule payments for regional variations in physicians' cost of practice. The GPCI is an input price index that measures the relative cost of a standard market basket of physician practice inputs across areas. The Laspeyres index number form chosen for the GPCI requires two basic components: national shares of each practice input in total practice expenses and relative price terms for each area. GPCI index values for each area are calculated by weighting the relative price terms by the national expense shares to form an average relative price for practice inputs in each area.

Relative prices by area are determined for four practice inputs: physician time, nonphysician employee wages, malpractice insurance premiums, and office rent. Geographic variation in the price of medical equipment, medical supplies, and miscellaneous is felt to be minimal. Congress specified that the GPCI be divided into three components for the Medicare Fee Schedule: the physician work GPCI, the practice expense GPCI, and the malpractice GPCI. The practice expense GPCI combines the indexes for employee wages and office rents, and the cost share for medical supplies, medical equipment, and miscellaneous:

GPCIPE = 0.391(EMPLOYEE WAGE INDEX) + 0.276(OFFICE RENT INDEX) + .333,

where the shares of employee compensation, office rent, and supplies, equipment, and miscellaneous in practice expenses are 0.391, 0.276, and 0.333, respectively.[1]

[1]These are the current (1992), not updated (1996), physician practice expense shares.

1.2 Overview of the Report

This report is divided into four parts, corresponding to the three components of the practice expense GPCI plus the overall index:

Part I: Employee Wage Index;
Part II: Office Rental Index;
Part III: Supplies, Equipment, and Miscellaneous Prices; and
Part IV: Practice Expense GPCI.

Each part is self-contained, and may be understood separately from the other parts. Appendix tables are contained in a companion appendix volume, with parts of the appendix corresponding to parts of this report. Alternatives chosen by the Health Care Financing Administration for the final 1996 payment GPCI are identified and discussed in each part of this report. In addition, Part IV assembles the updated (1996) component indices and discusses the overall updated (1996) practice expense GPCI.

PART I:

EMPLOYEE WAGE INDEX

PART I: EMPLOYEE WAGE INDEX

1.0 INTRODUCTION

1.1 Background on the Employee Wage Index

The employee wage index measures the relative cost of compensation of nonphysician employees in physicians' offices. Relative cost is measured for each Medicare payment locality. Four occupations are represented in the employee index: clerical (administrative support), registered nurses, licensed practical nurses, and medical technicians. For the current (1992) practice expense GPCI, a wage index for each occupation was developed from 1980 Census data on the median hourly earnings of these occupations by area. The wage indexes were combined according to the estimated share of each occupation in the total compensation of nonphysician employee in physicians' offices. These shares were estimated using HCFA's 1983 Physician Practice Cost and Income Survey and earnings data from the 1980 Census.

1.2 Criticisms of the Employee Wage Index

The employee wage index has been generally accepted, with only one serious criticism directed at it. The major criticism is the age of the 1980 Census data used in the 1992 GPCI. Some commentators have felt that data of this vintage does not adequately represent current wage patterns, especially in areas (e.g., the Northeast) where wages have risen rapidly in the 1980s. The 1996 GPCI should answer those concerns, since we update the employee wage index with 1990 Census data.

There are two other possible concerns about the employee wage index. The first is with the industry mix of the data used. All-industry data is used in the current GPCI to ensure adequate sample sizes to measure median hourly earnings accurately. That means, for example, that clerical workers in manufacturing firms as well as in physicians' offices are used to measure clerical wages in the GPCI. If the wages of the GPCI occupations differ systematically by industry, and industry mix differs by area, the current GPCI could be a biased measure of relative wages in physician offices. We conduct a limited test of this hypothesis by constructing an employee wage index using wages of clerical workers in nonmanufacturing industries, and comparing it to the all-industry GPCI.

The second concern is that the use of median earnings for entire Metropolitan Statistical Areas (MSAs) may not account for higher wage levels in Medicare localities composed of central city areas, e.g., the Manhattan, New York, and Cook County, Illinois localities. This concern applies to all the GPCI components based on MSA data (e.g., the office rental index and physician work GPCI), not just the employee wage index. In this report, we present an employee wage index calculated by county for counties in Consolidated Metropolitan Statistical Areas (CMSAs) and compare it to the MSA-based index.

1.3 Overview of Part I of the Report

The next chapter discusses basic characteristics of the 1990 Census earnings data used to update the employee wage index. Sample size distributions by occupation and locality are presented. Chapter 3 discusses the methods used to compute the updated employee wage indexes, including computation of updated occupational shares for clerical workers, registered nurses, licensed practical nurses, and medical technicians. Chapter 4 is the heart of the report. Alternative employee wage indexes are presented and evaluated. Differences are highlighted by identifying the localities with the largest changes in index values between alternatives. Also, a comparison to another major cross-sectional wage index, the PPS hospital wage index, is made.

Chapter 5 discusses the final employee wage index chosen by the Health Care Financing Administration based on the earlier analyses contained in this report. This index will be used for payment in the 1996 practice expense GPCI. The final (1996) employee wage index incorporates the Office of Management and Budget's June 1993 metropolitan area redefinitions and is weighted by practice expense relative value units (RVUs) rather than by population.

Appendix II-1 shows the alternative employee wage indices discussed in Chapter 4 by Medicare payment locality. These indices were constructed before RVU weighting factors and OMB's June 1993 metropolitan area redefinitions were available. (They are population weighted). Thus, they are not strictly comparable to the final payment indices discussed in Chapter 5 or shown in the following appendices. However, the differences between the earlier indices and the final 1996 indices are minor and do not affect the conclusions of the report.

Appendix II-2 shows differences by payment locality between the final 1996 employee wage index weighted by RVUs and by population. Appendix II-3 displays the employee wage indices used in the final (1996) practice expense GPCI. Appendix II-4 ranks payment localities by descending order of difference between the 1996 (updated) and 1992 (current) employee wage indices.

2.0 DATA FOR THE EMPLOYEE WAGE INDEX

Potential data sources for the employee wage index were reviewed in Zuckerman, Welch, and Pope (1987). It was concluded that decennial Census data were the best available for the employee wage index, and 1980 Census data are used in the current (1992) GPCI. Since that report, the Physician Payment Review Commission (PPRC, 1991) and the U. S. General Accounting Office (GAO, 1993) have reviewed the GPCI and have concluded that the Census data is a good choice for use in the employee wage index, although the 1980 Census data need to be updated.

2.1 Description of Census Data

As part of the decennial Census, questions on income, hours worked, place of work, and occupation are asked of roughly 20 percent of the United States population (the exact sampling rate varies by type of area). All Census data are self reported. Earnings refer to calendar year 1989. Health Economics Research, Inc., contractor to the Health Care Financing Administration, obtained a special tabulation of 1990 Census earnings data by occupation and area from the U.S. Bureau of the Census. The sample is the experienced civilian labor force. Earnings are defined as the sum of wage or salary income and net income from self-employment. (Nonlabor income is excluded.) Both mean and median hourly earnings are tabulated, with workers classified by their place of work. For the 1980 Census, place of work was tabulated for only one-half of the full sample. In 1990, place of work is assigned for most workers, so the place of work sample is nearly as large as the place of residence sample. All 1990 Census data presented in this report classify workers by place of work. Earnings data were obtained for metropolitan areas, counties, states, and the nonmetropolitan portions of states. For certain occupations, earnings data were also obtained cross-classified by certain industry groupings, such as non-manufacturing workers.

2.2 Sample Sizes of Census Data

Table 2-1 presents the distribution by Medicare payment locality of sample sizes for each occupation group used in the non-physician employee wage index. Census provides estimates of the total number of people in each occupation/area cell. We have divided by 6 to (conservatively) account for the Census "long form" sampling rate of 15-20 percent on

TABLE 2-1

DISTRIBUTION OF 1990 CENSUS SAMPLE SIZES FOR EMPLOYEE OCCUPATION GROUPS, BY MEDICARE PAYMENT LOCALITY

	Share*	Minimum	1%	5%	10%	25%	Median	Maximum
Occupation								
Administrative support	44.8 %	747	899	1,319	2,041	5,301	10,814	130,053
Registered Nurses	25.1	40	76	131	192	537	1,122	11,936
Licensed Practical Nurses	9.2	3	23	40	67	115	285	1,598
Health technicians	20.9	30	39	69	155	378	660	16,299

* Share of practice expense GPCI non-physician employee wage index.

SOURCE: 1990 Census Special tabulation.

earnings questions. The expenditure share weight of each occupation in the employee wage index is also indicated.

Sample sizes for administrative support personnel are much greater than for the three patient care occupations. The smallest sample size for any locality is 747, and three-fourths of all localities had more than 5,000 administrative workers sampled. Random error arising from sampling error is not a problem for administrative support workers.

The sample sizes for registered nurses and health technicians are much smaller. However, the smallest locality samples of 40 and 30, respectively, are not so small that we would expect median earnings to be significantly affected by the small samples. The sample of licensed practical nurses is quite small in some localities, with an estimated minimum sample of 3. However, the small sample is a problem for only a few localities; 95 percent of the localities have samples larger than 40 (the fifth percentile value), and ninety percent of the localities have samples larger than 67 (the tenth percentile value). In addition, with an expenditure share of only 9.2% in the wage index, the degree of randomness in the wage data for licensed practical nurses would need to be quite large to show a major effect on the employee wage index.

We conclude that the Census sample sizes are sufficient to accurately measure median hourly earnings by Medicare payment locality, although earnings estimates for the medical occupations, especially LPNs, in the least populous localities (such as some of the Texas localities) are subject to nontrivial random sampling error.

3.0 METHODS FOR COMPUTING NON-PHYSICIAN EMPLOYEE WAGE INDEXES

The nonphysician employee wage proxy has two components: (1) employee expenditure shares by occupational category, and (2) geographic wage indexes for four occupational categories employed by physicians. Section 3.1 discusses determination of the occupation shares and compares the updated shares with those used in constructing the current GPCI. Section 3.2 discusses the methodology used for creating the alternative employee wage indexes for Medicare payment localities.

3.1 Occupation Shares for Employee Occupations

3.1.1 Data Source

The data source for the number of employees by occupation category is the 1988 Physicians' Practice Costs and Income Survey (PPCIS), sponsored by the Health Care Financing Administration. The American Medical Association's Physician Masterfile, a comprehensive file of all physicians practicing in the U.S., was used as the sampling frame. A nationally-representative sample of physicians, stratified by specialty, census division, and urban/rural location, was randomly selected from the Masterfile. To be eligible for the survey, physicians had to meet the following criteria:

1. currently provide patient care services for at least 20 hours per week;
2. not currently a resident, clinical fellow or research fellow;
3. not employed by a faculty practice plan, hospital, clinic or HMO, or by a federal government agency in 1988;
4. if in a multipractice arrangement, greater than 80 percent of income from the practice in which the physician was full or part owner, or employed by another physician or group of physicians;
5. have spent at least twenty hours per week in patient care (or services) during 1988; and
6. have been in the same private practice for all of 1988.

The final number of completed cases was 3,505, a response rate of 61%.

Physicians were asked the number of individuals employed by the practice for each of eight occupational groups: social workers or psychologists; certified registered nurse

anesthetists (CRNAs); registered nurses; licensed practical nurses; medical aides, X-ray and laboratory technicians; physician's assistants or nurse practitioners; other patient care employees; and administrative and clerical staff. They were then asked how many employees in each of these groups worked at least 20 hours per week.

3.1.2 Computation

Although the PPCIS asks for eight occupation groups, several occupations are rare in physicians' offices and are unavailable or have limited sample sizes in the Census earnings data. Thus, we collapsed the eight PPCIS categories into the four used in constructing the current employee wage index: administrative and clerical staff, registered nurses, licensed practical nurses, and medical technicians. For construction of the cost shares, registered nurses, CRNAs, physicians' assistants and nurse practitioners, and social workers and psychologists were all included in the registered nurses category. It is unclear what types of workers would be included in the PPCIS "other patient care employees" category. This category comprised only 3.8 percent of the workers on the survey. To allocate these workers, the three patient care categories (RNs, LPNs, and medical technicians) were inflated proportionately to absorb the other patient care workers.

Employee shares were averaged weighted by practice size, with size defined by number of nonphysician employees. Weighting by practice size increases the shares of the patient care employees relative to administrative employees because larger practices use higher proportions of patient care employees. Finally, the employee shares were multiplied by the median national hourly earnings of each of the four occupation groups from the 1990 Census, and the cost share (percent of total payroll) of each group was calculated.

3.1.3 Comparison with Current Shares

Table 3-1 presents both the current shares used in calculating the (1992) non-physician employee wage index, and the updated shares calculated from the 1988 PPCIS and the 1990 Census. The administrative and clerical personnel category has the largest share in both the current and updated versions. However, the share fell substantially, from 60.4% to 44.8%. The three patient care occupation categories all experienced increases in their weights. The share of LPNs rose from 6.9% to 9.2%, as did the share of RNs, from 20.4% to 25.1%. Health technicians experienced the largest increase in cost shares, from 12.3% to 20.9%.

TABLE 3-1

OCCUPATIONAL EXPENDITURE SHARES FOR THE EMPLOYEE WAGE INDEX

Occupational Group	Current Share	Updated Share
Administrative Support Personnel, Including Clerical	60.4 %	44.8 %
Registered Nurses	20.4	25.1
Licensed Practical Nurses (LPNs)	6.9	9.2
Health Technicians, Excluding LPNs	12.3	20.9

SOURCE: 1984 and 1988 Physicians' Practice Costs and Income Survey.

These differences appear to be due to our use of employee counts weighted by practice size, since larger practices use a lower proportion of administrative personnel. Weighting by practice size is appropriate because the GPCI adjusts per service payments. Because larger practices provide more services, they should be weighted more heavily in determining the employee shares. In addition, the wages of medical personnel such as registered nurses have risen rapidly in the 1980s compared to other occupational groups, which would increase medical occupations' shares, because the shares are weighted by earnings.

3.1.4 Validation Versus AMA SMS Shares

The American Medical Association's Socioeconomic Monitoring System (SMS) survey does not collect as many non-physician employee occupations as the PPCIS. It asks only for two broad categories: administrative and clerical personnel, and patient care employees. However, SMS data can be used to validate the PPCIS administrative versus medical employees share.

Published data from the AMA (AMA 1989, AMA 1991) provide the number of full time equivalent (FTE) nonphysician employees per physician and the number of FTE administrative and clerical personnel per physician. Assuming the difference between these two reflects the number of patient care employees per physician, we can multiply the national earnings per hour by the number of FTE employees to calculate shares for administrative and patient care employees. In 1988, administrative employees accounted for 49.4 percent of the cost of nonphysician employees per physician according to the SMS data. In 1991, this figure had fallen slightly to 48.7 percent. These values are much closer to the 1988 PPCIS share of 44.8 percent than the earlier share of 60.4 percent. We consider the PPCIS shares to be validated by the AMA data.

3.2 Non-Physician Employee Wage Indexes

3.2.1 Create County File of Wages for Occupation Categories

Census earnings data were obtained for metropolitan areas, counties, states, and the nonmetropolitan portions of states. Census uses several metropolitan area definitions. Metropolitan Statistical Area (MSA) is the most general term. Consolidated Metropolitan Statistical Areas (CMSA) are the largest, most populous MSAs. Primary Metropolitan

Statistical Areas (PMSAs) are smaller metropolitan areas that are the constituents of CMSAs. In New England, MSAs are not county-based, so Census also defines New England County Metropolitan Areas (NECMAs). We began our analysis by creating two files of median earnings by occupation. The county is the unit of observation for both files, but, for most counties, earnings data is mapped onto counties from a higher geographic level (e.g., median metropolitan area earnings mapped onto all counties comprising the MSA). Counties cannot be used as the basis for creating the GPCI everywhere because sample sizes are too small to permit accurate estimation of earnings for each county. The two analytic files are:

1. A county level file with metropolitan area and statewide nonmetropolitan Census earnings by occupation. Outside of New England, metropolitan areas were defined as either Primary Metropolitan Statistical Areas (PMSAs) within Consolidated Metropolitan Areas (CMSA), or Metropolitan Statistical Areas (MSAs) outside of CMSAs. In New England, metropolitan area was defined as New England County Metropolitan Areas (NECMAs) rather than MSAs. Nonmetropolitan areas were defined as all counties in a state not located in an MSA or NECMA. For example, every county in Wyoming is included as an observation on this file. Counties in the Casper MSA (the only metropolitan area in Wyoming) are all assigned the Casper MSA median earnings. All other counties in the state are assigned Wyoming nonmetropolitan median earnings.

2. A county level file with county earnings for counties in CMSAs, metropolitan area earnings for counties in MSAs, but not in CMSAs, and statewide nonmetropolitan earnings for counties not in MSAs or CMSAs. Thus, this file is identical to that described in 1. above, except that PMSA earnings in CMSAs are replaced with county earnings. Census defines three CMSAs in New England--Boston, Hartford, and Providence--but they are not county based. Three NECMAs match the three New England CMSAs. For the purposes of creating this file, we treated the Boston, Massachusetts, Hartford, Connecticut, and Providence, Rhode Island NECMAs as CMSAs. That is, we used county earnings for counties within these three NECMAs.[1]

Both files described above contain earnings for each occupation, and for all stratifications (i.e., industry, education). Two parallel files were then created for mean rather than median earnings. All files also contain county population from the 1990 Census.

---

[1]In their June 1993 revision of metropolitan area definitions, Census/OMB defined only one CMSA in New England: Boston. Thus, for the final payment employee wage index, only the Boston NECMA was considered to be equivalent to a CMSA. Several towns in Connecticut, mostly in Fairfield county, are part of the New York City CMSA and also part of the New Haven-Bridgeport-Stamford-Danbury-Waterbury, Connecticut NECMA. We considered Fairfield county to be part of the NECMA, not the CMSA, for purposes of computing the final payment employee wage index.

3.2.2 Calculate County Index

County indices were created using two different county weights: population and work relative value units (RVUs). To maintain comparability with the 1992 GPCI, and because RVUs by county were unavailable when the work was originally done, alternative employee wage indices were explored using population weights. All employee wage indices presented in Chapter 4 are population weighted. The final payment wage indices (Chapter 5, Appendices I-2, I-3, and I-4, and Part IV of the report), however, are weighted by RVUs. The choice of population or RVU weights has only a small effect on the index values (Appendix I-2). The same methods, described now, were used with either weight.

The population or RVU-weighted national average of the wages assigned to counties was taken for each of four occupation groups--administrative support occupations, registered nurses (RNs), licensed practical nurses (LPNs), and medical technicians. Although they are included on the file, Puerto Rico, the Virgin Islands, and Guam were excluded from this national average, as they were in calculating the current (1980 Census based) non-physician employee wage index.[2] A county-level index was computed for each occupation by dividing each county's median wage by the population or RVU-weighted national average. The county-level non-physician employee index was then calculated by multiplying these occupation-specific indexes by the occupation cost shares from Table 3-1 and summing.

3.2.3 Translate County Index to Medicare Payment Localities

Finally, the county index was translated to Medicare payment localities. Locality indexes are population or RVU-weighted averages of their constituent county indexes. If a locality includes only part of a county, that county index is included in the locality average weighted by the population or RVUs of the county part. If a locality is entirely within one county, it is assigned that county's index.

---

[2]Whether or not Puerto Rico and other outlying areas are included in the national average does not affect the final payment index values because the values are rescaled to maintain budget neutrality (i.e., the same aggregate work payments to physicians).

4.0 ALTERNATIVE NON-PHYSICIAN EMPLOYEE WAGE INDEXES

This chapter presents four alternatives for updating the current non-physician employee wage index (which is based on 1980 Census data) with 1990 Census data. The alternatives are:

(1) an update using 1990 Census data, but with no other changes from the current GPCI;

(2) 1990 Census data with the earnings of administrative support staff in non-manufacturing industries replacing earnings of administrative support staff in all industries;

(3) 1990 Census data with county-specific earnings for counties in Consolidated Metropolitan Statistical Areas (CMSAs); and

(4) 1990 Census data using mean earnings rather than median earnings.

The next four subsections--Sections 4.1 through 4.4--describe the rationale for each of these alternatives, and then identify which Medicare payment localities' employee wage indexes change the most as a result of changing the method of computation. Finally, as a means of evaluating the validity of the updated wage index, in Section 4.5 we compare it to the PPS hospital wage index, another major cross-sectional index of wages.

4.1 Updating With 1990 Census Data

Updating with the 1990 Census data is the simplest alternative. It has the advantage of being consistent with the method by which the current (1992) GPCI was produced. A comparison with the 1980-Census-based current employee wage index isolates the effects of relative wage changes from 1979 to 1989 from changes in method of computation.

Updating with newer data, but using the same methodology, results in substantial changes in the non-physician employee wage index. Medicare payment localities experiencing more than a 7 percentage point gain or loss from updating to the 1990 Census data are shown in Table 4-1. Of the 232 localities[3], 54, or nearly one-quarter, experience more

[3]The GPCI was originally defined for 232 localities. Several multilocality states have recently established single state-wide localities, reducing the current number of localities to 216. For comparisons of 1990 Census-based GPCIs to 1980 Census-based GPCIs, we use the original 232 localities. For comparisons among alternative GPCIs based on 1990 Census data, we use the current 216 localities.

TABLE 4-1

MEDICARE PAYMENT LOCALITIES EXPERIENCING LARGE CHANGES IN THE EMPLOYEE WAGE INDEX AS A RESULT OF UPDATING WITH 1990 CENSUS DATA (a)

Locality Name	Carrier/ Locality	Updated Index	Current Index	Change	Percent Change
Largest Increases					
SOUTH CENTRAL CONN.	10230/03	1.270	1.031	0.239	23.2 %
SW CONNECTICUT	10230/02	1.310	1.076	0.234	21.7
NW AND N.CENTRAL CONN.	10230/01	1.231	1.016	0.215	21.2
EASTERN CONN.	10230/04	1.200	1.000	0.200	20.0
MASSACHUSETTS URBAN	00700/01	1.214	1.022	0.192	18.7
MASS.SUBURBS/RURAL(CITIES)	00700/02	1.163	0.993	0.170	17.2
RHODE ISLAND	00870/01	1.099	0.955	0.144	15.1
NEW HAMPSHIRE	00780/40	1.027	0.908	0.119	13.1
NORTHERN NEW JERSEY	00860/01	1.214	1.096	0.118	10.8
NYC SUBURBS/LONG I., NY	00803/02	1.288	1.187	0.101	8.5
VERMONT	00780/50	0.966	0.872	0.094	10.8
SANTA CLARA, CA	00542/09	1.316	1.225	0.091	7.4
MIDDLE NEW JERSEY	00860/02	1.092	1.004	0.088	8.7
SOUTHERN MAINE	21200/03	0.978	0.892	0.086	9.7
MANHATTAN, NY	00803/01	1.325	1.245	0.080	6.5
QUEENS, NY	14330/04	1.325	1.245	0.080	6.5
FORT LAUDERDALE, FL	00590/03	1.005	0.928	0.077	8.3
ATLANTA, GA	01040/01	1.072	0.999	0.073	7.3
RICHMOND+CHARLOTTESVL, VA	10490/01	1.023	0.952	0.071	7.5
Largest Decreases					
PEORIA, IL	00621/05	0.903	1.085	-0.182	-16.8 %
ALASKA	01020/01	1.275	1.437	-0.162	-11.3
ROCK ISLAND, IL	00621/04	0.848	0.976	-0.128	-13.1
DETROIT, MI	00710/01	1.069	1.196	-0.127	-10.6
NORMAL, IL	00621/08	0.874	0.995	-0.121	-12.2
MILWAUKEE SUBURBS, WI (SE)	00951/46	0.956	1.075	-0.119	-11.1
DECATUR, IL	00621/11	0.836	0.950	-0.115	-12.0
WHEELING, WV	16510/17	0.809	0.920	-0.111	-12.1
SOUTHERN, IL	00621/14	0.800	0.909	-0.109	-12.0
NORTHWEST, IL	00621/01	0.800	0.909	-0.109	-11.9
QUINCY, IL	00621/07	0.800	0.909	-0.109	-11.9
SOUTHEAST IL	00621/13	0.800	0.909	-0.109	-11.9
NORTH CENTRAL IOWA	00640/03	0.806	0.914	-0.108	-11.9
KANKAKEE, IL	00621/06	0.833	0.941	-0.108	-11.5

TABLE 4-1 (continued)

MEDICARE PAYMENT LOCALITIES EXPERIENCING LARGE CHANGES IN THE EMPLOYEE WAGE INDEX AS A RESULT OF UPDATING WITH 1990 CENSUS DATA (a)

Locality Name	Carrier/ Locality	Updated Index	Current Index	Change	Percent Change
CLEVELAND, OH	16360/00	0.949	1.053	-0.104	-9.8
S.CEN. IA(EXCL DES MOINES)	00640/04	0.777	0.878	-0.101	-11.6
TOLEDO (LUCAS/WOOD), OH	16360/00	0.949	1.048	-0.099	-9.4
NORTHWEST IOWA	00640/06	0.790	0.883	-0.093	-10.6
MILWAUKEE, WI	00951/04	0.982	1.074	-0.092	-8.6
DE KALB, IL	00621/03	0.835	0.927	-0.092	-9.9
CHAMPAIGN-URBANA, IL	00621/10	0.829	0.920	-0.091	-9.9
SE IOWA (INCL IOWA CITY)	00640/01	0.841	0.932	-0.091	-9.8
MINNESOTA STATEWIDE	00720/00	0.879	0.969	-0.090	-9.3
MONTANA	00751/01	0.833	0.918	-0.085	-9.3
SOUTHWEST IOWA	00640/07	0.815	0.900	-0.085	-9.4
BROWNSVILLE, TX	00900/10	0.777	0.859	-0.082	-9.6
NORTHEAST IOWA	00640/02	0.831	0.910	-0.079	-8.7
MICHIGAN, NOT DETROIT	00710/02	0.959	1.038	-0.079	-7.6
REST OF MO	11260/03	0.767	0.843	-0.076	-9.1
CINCINNATI, OH	16360/00	0.949	1.024	-0.075	-7.3
SOUTHERN VALLEY, WV	16510/20	0.821	0.893	-0.072	-8.1
OHIO RIVER VALLEY, WV	16510/19	0.823	0.895	-0.072	-8.1
CHICAGO, IL	00621/16	1.083	1.155	-0.072	-6.2
WYOMING	00825/21	0.884	0.956	-0.072	-7.5
EASTERN VALLEY, WV	16510/18	0.831	0.902	-0.071	-7.9

(a) more than a seven percentage point gain or loss

than a 7 percentage point change. Nineteen, or 9 percent, gain more than 7 percentage points, and 35, or 16 percent, lose more than seven percentage points.

The eight localities experiencing the largest gains, ranging from 12 to 24 percentage points, are all in New England. Sixteen localities, many in the Midwest, experience decreases of greater than ten percentage points as a result of updating the wage index. Peoria, Illinois loses 18 percentage points, the most of any locality. Other Illinois localities, Alaska, Detroit, Michigan, and the Milwaukee suburbs are among the largest losers. The geographic concentration of the gainers and losers is unlikely if they were the result of random error in the Census wage data.

The magnitude of the wage index changes is not surprising given the ten year lag in updating between the 1980 and 1990 Census data. Changes in wage indices can also arise because of changes in locality definitions, although the number of localities that has been modified is small. For example, the 1992 GPCI for Ohio is based on fifteen separate localities, while the 1996 GPCI is based on one consolidated locality encompassing the entire state.

4.2 Non-Manufacturing Administrative Support Staff Wages

The hourly earnings of an occupation in an area may be affected by industry mix. Areas with concentrations of large, unionized manufacturing firms may have higher administrative and clerical support earnings than other areas. However, these wages would not necessary reflect the conditions found in physicians' offices, which are smaller firms and not unionized. We can test for the effect of industry mix on clerical wages by limiting our Census sample for clerical workers to non-manufacturing industries. The occupation share for the administrative support staff (at 45 percent) is larger than the share for any other occupation group included in the employee wage index. Thus, use of administrative wages from non-manufacturing industries, rather than all industries, could potentially have noticeable effects on the employee wage index in areas that have large concentrations of unionized manufacturing workers.

Table 4-2 presents the largest changes in the employee wage index by payment locality as a result of using clerical wages from non-manufacturing industries compared to all industries. The changes are quite minor. Only 6 localities gain more than one percentage point; the largest gain is only 1.2 percentage points. Sixteen localities lose more than one

TABLE 4-2

MEDICARE PAYMENT LOCALITIES EXPERIENCING THE LARGEST CHANGES IN THE EMPLOYEE WAGE INDEX AS A RESULT OF USING WAGES OF NON-MANUFACTURING INDUSTRY CLERICAL WORKERS (a)

Locality Name	Carrier/ Locality	Non-manufacturing Index	Current Index	Change	Percent Change
Largest Increases					
MANHATTAN, NY	00803/01	1.338	1.325	0.012	0.9 %
QUEENS, NY	14330/04	1.338	1.325	0.012	0.9
MIAMI, FL	00590/04	1.054	1.043	0.012	1.1
DC +MD/VA SUBURBS	00580/01	1.201	1.189	0.011	0.9
NYC SUBURBS/LONG I., NY	00803/02	1.299	1.288	0.011	0.9
YUMA, AZ	01030/08	0.877	0.866	0.011	1.2
Largest Decreases					
BRAZORIA, TX	00900/09	0.917	0.943	-0.026	-2.8 %
ROCHESTER/SURR. CNTYS, NY	00801/02	0.966	0.990	-0.024	-2.4
PEORIA, IL	00621/05	0.882	0.903	-0.021	-2.3
SANTA CLARA, CA	00542/09	1.298	1.316	-0.018	-1.4
GRAYSON, TX	00900/16	0.836	0.853	-0.018	-2.1
MIDLAND, TX	00900/23	0.957	0.972	-0.016	-1.6
BEAUMONT, TX	00900/20	0.886	0.899	-0.013	-1.5
ORANGE, TX	00900/25	0.886	0.899	-0.013	-1.5
OSHKOSH (E CNTRL), WI	00951/60	0.868	0.881	-0.013	-1.5
METROPOLITAN IN	00630/01	0.931	0.943	-0.012	-1.3
REST OF IN	00630/03	0.856	0.868	-0 012	-1.4
LAKE CHARLES, LA	00528/04	0.914	0.926	-0.012	-1.3
DECATUR, IL	00621/11	0.824	0.836	-0.011	-1.4
MILWAUKEE SURBURBS (SE), WI	00951/46	0.945	0.956	-0.011	-1.2
ROCKFORD, IL	00621/02	0.974	0.986	-0.011	-1.2
URBAN IN	00630/02	0.876	0.886	-0.011	-1.2

(a) more than a one percentage point gain or loss

percentage point. Three localities lose more than two percentage points: Brazoria, Texas, Rochester, New York, and Peoria, Illinois. Four other localities in Texas are among the largest losers. We conclude that there is little reason to use non-manufacturing clerical earnings rather than all-industry clerical wages in the employee wage index.

4.3 County-Specific Wages in CMSAs

The current employee wage index, as well as the two updated options presented above, utilize metropolitan-wide median wages in computing Medicare payment locality index values. In smaller metropolitan areas this is probably not a significant shortcoming because wages are likely to be reasonably homogeneous across the entire metropolitan area. However, significant wage variation may exist within large metropolitan areas. The third non-physician employee wage index alternative uses county-specific earnings for counties within large metropolitan areas, defined as Consolidated Metropolitan Statistical Areas, or CMSAs.

The most useful comparison for this option is the 1990 update without county-specific wages (option 1 for updating). This comparison isolates the effects of using county-specific wages. The largest differences by payment locality between the updated employee wage index and the updated index with county-specific wages are displayed in Table 4-3.

The changes with county-specific earnings are not very large. The largest increase is 4 percent, and the largest loss, with one exception, is 5 percent. Ten localities gain more than one percentage point and seventeen localities lose more than one percentage point as a result of differentiating wages by county within CMSAs. The changes are in the expected direction: localities that comprise core areas of large cities gain, and suburban ring localities lose. The Manhattan, New York locality (5.8 percentage points) and the Philadelphia/Pittsburgh, Pennsylvania Medical Schools locality (4.9 percentage points) experience the largest gains from use of county data within CMSAs. The other gainers, with the exception of San Bernadino, California, are all large cities. By far the largest loss is the 14.1 percentage points for the Denton, Texas locality. This locality is part of suburban Dallas, and we believe the change reflects actual wage differences, not random measurement error. No other locality loses more than five percent.

Although the employee wage index is not greatly affected by using county-specific data within CMSAs, we believe that this is a justifiable change in the method of computing it. Several populous central city localities would appropriately benefit from this change. We

TABLE 4-3

MEDICARE PAYMENT LOCALITIES EXPERIENCING LARGE CHANGES IN THE EMPLOYEE WAGE INDEX AS A RESULT OF USING COUNTY LEVEL DATA WITHIN CMSAS (a)

Locality Name	Carrier/ Locality	CMSA/County Index	Updated Index	Change	Percent Change
Largest Increases					
MANHATTAN, NY	00803/01	1.383	1.325	0.058	4.4 %
PHILLY/PITT MED SHCLS/HOSPS, PA	00865/01	1.133	1.084	0.049	4.5
SAN FRANCISCO, CA	00542/05	1.361	1.328	0.033	2.5
MILWAUKEE, WI	00951/04	1.007	0.982	0.025	2.6
DALLAS, TX	00900/11	1.040	1.020	0.020	2.0
SAN BERNADINO/E.CTRL CNTYS CA	00542/15	1.108	1.090	0.018	1.7
DETROIT, MI	00710/01	1.083	1.069	0.014	1.3
HOUSTON, TX	00900/18	1.040	1.028	0.012	1.2
FORT WORTH, TX	00900/28	0.982	0.970	0.012	1.3
CHICAGO, IL	00621/16	1.094	1.083	0.011	1.0
Largest Decreases					
DENTON, TX	00900/12	0.879	1.020	-0.141	-13.8 %
ROCKFORD, IL	00621/02	0.939	0.986	-0.047	-4.8
MILWAUKEE SURBURBS (SE), WI	00951/46	0.923	0.956	-0.033	-3.4
NYC SUBURBS/LONG I., NY	00803/02	1.256	1.288	-0.032	-2.5
SAN MATEO, CA	00542/06	1.297	1.328	-0.032	-2.4
NORTHEAST RURAL TX	00900/02	0.837	0.868	-0.030	-3.5
QUEENS, NY	14330/04	1.300	1.325	-0.025	-1.9
RIVERSIDE, CA	00542/27	1.069	1.092	-0.023	-2.1
SM CITIES (CITY LIMITS) KY	00660/02	0.848	0.869	-0.021	-2.5
MARIN/NAPA/SOLANO, CA	00542/03	1.184	1.206	-0.021	-1.8
SOUTHEAST RURAL TX	00900/03	0.846	0.866	-0.021	-2.4
SOUTHERN NJ	00860/03	1.077	1.092	-0.015	-1.4
POUGHKPSIE/N NYC SUBURBS, NY	00803/03	1.017	1.030	-0.013	-1.3
MIDDLE NJ	00860/02	1.080	1.092	-0.011	-1.0

(a) more than a one percentage point gain or loss

believe that the wages physicians have to pay for their non-physician employees in these central city areas are in fact higher. If county-specific data in CMSAs is used in other GPCI price proxies (e.g., the office rental measure and the physician work measure), then it is consistent to use it in computing the employee wage index.

4.4 Mean Earnings

Our first three alternatives are based on median wages, as is the current employee wage index computed from 1980 Census data. Median earnings have been used rather than mean earnings because they are less sensitive to the extremes of the earnings distribution. Hence, medians are less likely to be affected by anomalous, "outlier" reported wages than are means. Especially with small samples, as occurs in some of the less populous localities, median earnings are likely to be more stable and have a lower standard error than mean earnings. In addition, medians are a better measure of the earnings of the "typical" employee than mean earnings. Mean earnings would reflect, for example, a compressed earnings distribution due to unionization, or a skewed distribution at upper earnings level due to a few high-earning individuals. In general, unusual extremes of the earnings distribution should not be reflected in the GPCI.

The one advantage of mean earnings is that they can be consistently aggregated to different geographic levels. For example, state-wide mean earnings are a weighted average of individual locality mean earnings. Median earnings does not have this property: the state-wide median is not a weighted average of the individual locality medians. Mean earnings can therefore be scaled consistently from the county level to the state level. This could be an advantage if the geographic areas for physician payment are modified, as recommended, for example, by the Physician Payment Review Commission (PPRC, 1992).

Table 4-4 presents the largest changes in employee wage index values comparing the median-based and the mean-based indexes. (Both indexes use county-specific data within CMSAs.) The changes from using mean earnings are small. Only 3 localities experience gains of five or more percentage points: Wausau, Wisconsin (5.2 percentage points), Wheeling, West Virginia (5.1 percentage points), and Rockford, Illinois (5.0 percentage points). No localities experience a loss of more than five percentage points and only three localities San Francisco, California (4.5 percentage points), Salem and other cities, Oregon (4.0 percentage points) and Massachusetts suburbs/rural cities (4.0 percentage points) experience a loss of four percentage points or more. The reasons for the differences are difficult to

TABLE 4-4

MEDICARE PAYMENT LOCALITIES EXPERIENCING LARGE CHANGES IN THE EMPLOYEE WAGE INDEX AS A RESULT OF USING MEAN RATHER THAN MEDIAN EARNINGS (a)

Locality Name	Carrier/ Locality	Means Index	Median Index	Change	Percent Change
Largest Increases					
WAUSAU (N CNTRL), WI	00951/36	0.905	0.852	0.052	6.1 %
WHEELING, WV	16510/17	0.862	0.811	0.051	6.3
ROCKFORD, IL	00621/02	0.989	0.939	0.050	5.3
PEORIA, IL	00621/05	0.954	0.905	0.049	5.4
TEXARKANA, TX	00900/08	0.902	0.853	0.049	5.8
BEAUMONT, TX	00900/20	0.950	0.901	0.049	5.4
ORANGE, TX	00900/25	0.950	0.901	0.049	5.4
NORMAL, IL	00621/08	0.924	0.876	0.049	5.6
MONTANA	00751/01	0.883	0.835	0.048	5.7
SOUTHERN VALLEY, WV	16510/20	0.869	0.823	0.046	5.6
YUMA, AZ	01030/08	0.912	0.868	0.044	5.1
OHIO RIVER VALLEY, WV	16510/19	0.868	0.825	0.043	5.3
SAN ANGELO, TX	00900/30	0.854	0.812	0.042	5.2
GRAYSON, TX	00900/16	0.897	0.855	0.041	4.8
EASTERN VALLEY, WV	16510/18	0.874	0.833	0.041	4.9
SM E. CITIES, MO	11260/02	0.791	0.757	0.034	4.5
REST OF MO	11260/03	0.799	0.769	0.031	4.0
ABILENE, TX	00900/29	0.866	0.836	0.030	3.6
SOUTHEAST AL	00510/03	0.858	0.828	0.030	3.6
SOUTH DAKOTA	00820/02	0.797	0.768	0.029	3.8
TUSCON, AZ	01030/02	0.949	0.920	0.029	3.1
DECATUR, IL	00621/11	0.866	0.838	0.029	3.4
ANAHEIM/SANTA ANA, CA	02050/26	1.215	1.186	0.029	2.4
NORTHWEST AL	00510/01	0.883	0.855	0.028	3.3
BIRMINGHAM, AL	00510/05	0.954	0.928	0.026	2.8
ALEXANDRIA, LA	00528/07	0.878	0.853	0.026	3.0
RENO, ET AL. (CITIES), NV	01290/02	1.113	1.089	0.024	2.2
PUERTO RICO	00973/20	0.506	0.482	0.024	5.0
ROCK ISLAND, IL	00621/04	0.873	0.850	0.024	2.8
BATON ROUGE, LA	00528/03	0.929	0.905	0.024	2.6
OKLAHOMA	01370/00	0.889	0.865	0.023	2.7
REST OF AL	00510/06	0.846	0.823	0.023	2.8
RURAL NW COUNTIES, MO	00740/06	0.830	0.808	0.023	2.8
UTAH	00910/09	0.899	0.877	0.022	2.6
MOBILE, AL	00510/04	0.860	0.839	0.021	2.5
SANTA BARBERA, CA	02050/16	1.064	1.043	0.021	2.0
MERCED/SURR. CNTYS, CA	00542/10	1.024	1.003	0.021	2.1
DE KALB, IL	00621/03	0.852	0.831	0.021	2.5

TABLE 4-4 (continued)

MEDICARE PAYMENT LOCALITIES EXPERIENCING LARGE CHANGES IN THE EMPLOYEE WAGE INDEX AS A RESULT OF USING MEAN RATHER THAN MEDIAN EARNINGS (a)

Locality Name	Carrier/ Locality	Means Index	Median Index	Change	Percent Change
Largest Decreases					
SAN FRANCISCO, CA	00542/05	1.316	1.361	-0.045	-3.3 %
SALEM, ET AL. (CITIES), OR	01380/03	0.889	0.929	-0.040	-4.3
MASS SUBURBS/RURAL CITIES	00700/02	1.109	1.149	-0.040	-3.5
URBAN MASS	00700/01	1.176	1.214	-0.038	-3.2
OAKLAND/BERKLEY, CA	00542/07	1.246	1.283	-0.037	-2.9
EUGENE, ET AL. (CITIES), OR	01380/02	0.911	0.946	-0.035	-3.7
MADISON (DANE CNTY), WI	00951/15	0.955	0.989	-0.034	-3.5
SW CT	10230/02	1.279	1.313	-0.034	-2.6
REST OF OREGON	01380/99	0.907	0.940	-0.034	-3.6
VERMONT	00780/50	0.935	0.968	-0.033	-3.4
PORTLAND, ET AL. (CITIES), OR	01380/01	1.022	1.052	-0.031	-2.9
NEW HAMPSHIRE	00780/40	0.999	1.029	-0.030	-2.9
SANTA CLARA, CA	00542/09	1.289	1.319	-0.029	-2.2
RHODE ISLAND	00870/01	1.068	1.096	-0.028	-2.6
TEMPLE, TX	00900/06	0.848	0.874	-0.027	-3.0
SW OR CITIES (CITY LIMITS)	01380/12	0.885	0.909	-0.024	-2.6
MANHATTAN, NY	00803/01	1.360	1.384	-0.024	-1.7
SEATTLE (KING CNTY), WA	00932/02	1.080	1.104	-0.023	-2.1
LAS VEGAS, ET AL. (CITIES), NV	01290/01	1.002	1.025	-0.023	-2.2
S. CNTRL CT	10230/03	1.251	1.273	-0.022	-1.8
MILWAUKEE, WI	00951/04	0.986	1.007	-0.022	-2.1
SACRAMENTO/SURR. CNTYS, CA	00542/04	1.110	1.131	-0.021	-1.9

(a) more than a two percentage point gain or loss

Note: Both GPCIs utilize county-specific data within CMSAs.

determine without more information on the earnings distributions in the different areas. Less urban localities seem to be over-represented among the gainers, whereas some large cities are represented among the losers (e.g., San Francisco, Oakland, Manhattan, Seattle).
Although the median- and means-based indexes do not differ greatly, we prefer the medians-based index because of the lesser sensitivity of median earnings to the extremes of the earnings distribution.

4.5 Comparison to the PPS Hospital Wage Index

The hospital wage index used to compute PPS payments is based on a HCFA survey of hospital wage, salary, and compensation data for all hospitals paid under PPS. For each MSA and rural area of a state, the index compares the area's average hourly wage to the national average hourly wage of all hospital employees.

There is no strong conceptual basis for adopting the PPS wage index as the price proxy for employee wages. The occupational mix of workers employed by hospitals and by physicians' offices varies significantly. Almost one half of employee salaries are paid to secretaries and administrative staff in physicians' offices, while only about 12 percent of hospital labor costs are for these categories of workers (Zuckerman et al., 1987). In addition, the PPS wage index is based on a small number of workers (adding to sampling variability) and may reflect specific features of the hospital labor market (for example, a hospital with a unionized labor force) that may not be relevant to physicians' practices. Finally, the PPS wage index makes no adjustments for the occupation mix of hospital workers.

Although not an alternative to the GPCI employee wage index for payment purposes, the PPS wage index is useful in exploring the validity of the employee wage index, especially since it is a cross-sectional wage index based on an independent data source. We translated the 1988 PPS wage index to Medicare payment localities using our population-weighted county to locality crosswalk. Nonmetropolitan counties that have been reclassified as urban for purposes of computing their hospitals' PPS payments were assigned the nonmetropolitan wage index appropriate for their state.

We first computed the correlation between the updated employee wage index and the PPS wage index. It is 0.93, indicating a high degree of linear association between the two indexes. This supports the validity of both indexes. However, the slope coefficient in a regression of the GPCI employee wage index on the hospital wage index was only 0.80, indicating that the GPCI index is less variable than the PPS wage index. Concomitantly, the

GPCI index has a smaller range than the PPS wage index. The greater range of the PPS index could result from its lack of occupation mix corrections, from greater random error in less populous areas, or from differences between relative hospital wages and relative wages of the GPCI index occupations across areas.

Table 4-5 shows localities whose hospital wage index differs by more than 7 percentage points from the employee wage index updated with 1990 Census data. Despite the high correlation between the two indexes, several areas have substantially different index values, and a large number have moderately different values. Forty-four localities, roughly 20 percent of all localities, exhibit a difference of more than 7 percentage points between the two indexes. However, only 4 areas differ by more than 15 percentage points, and only 15 by more than 10 percentage points.

The PPS index exceeds the GPCI index by the largest amount in Temple, Texas. This may be due to the teaching hospital there, which could increase the average hospital wage. Otherwise, 10 of the 12 localities with higher PPS wage indexes are in California. Apparently, hospital workers are paid relatively better in California than the occupations included in the GPCI employee wage index. The updated GPCI index exceeds the PPS Index by more than 7 percentage points in 14 localities. In only two localities is the difference more than 10 percentage points: Northern New Jersey (13 percentage points) and Atlanta, Georgia (10 percentage points).

We conclude that the GPCI employee wage index and the PPS wage index are highly correlated and have similar index values for many areas, which supports the validity of both indexes. However, index values for a few areas differ significantly, and for a larger number of areas differ moderately. The precise reasons for these differences cannot be ascertained without further investigation, but differences in sample, time period, data source, mean earnings (PPS index) versus median earnings (GPCI index), total compensation (PPS index) versus wages (GPCI index), and random sampling error probably contribute to the differences. The differences do not necessarily indicate that either index is inaccurate, since they are designed to measure different things, namely, relative hospital wages (the PPS wage index), and relative wages of employees in physicians' offices (GPCI employee wage index).

TABLE 4-5

MEDICARE PAYMENT LOCALITIES WITH LARGE DIFFERENCES BETWEEN THE GPCI EMPLOYEE WAGE INDEX AND THE PPS WAGE INDEX (a)

Locality Name	Carrier/ Locality	1988 PPS Wage Index	Updated GPCI Index	Difference	Percent Difference
Largest Increases					
TEMPLE, TX	00900/06	1.143	0.872	0.271	31.1 %
MONTEREY/SANTA CLARA, CA	00542/12	1.292	1.071	0.222	20.7
SANTA CLARA, CA	00542/09	1.482	1.316	0.167	12.7
MARIN/NAPA/SOLANO, CA	00542/03	1.370	1.206	0.165	13.6
OAKLAND/BERKLEY, CA	00542/07	1.445	1.282	0.164	12.8
VENTURA, CA	02050/17	1.265	1.124	0.141	12.6
MERCED/SURR.CNTYS, CA	00542/10	1.126	1.001	0.125	12.5
PORTLAND, ET AL. (CITIES), OR	01380/01	1.172	1.047	0.125	11.9
SAN DIEGO/IMPERIAL, CA	02050/28	1.191	1.072	0.118	11.0
N. COASTAL CNTYS, CA	00542/01	1.194	1.078	0.115	10.7
SAN FRANCISCO, CA	00542/05	1.443	1.328	0.115	8.7
SAN MATEO, CA	00542/06	1.443	1.328	0.115	8.7
ALASKA	01020/01	1.390	1.275	0.114	9.0
ABILENE, TX	00900/29	0.933	0.834	0.099	11.9
KINGS/TULARE, CA	00542/13	1.096	0.997	0.099	9.9
SACRAMENTO/SURR. CNTYS, CA	00542/04	1.227	1.129	0.098	8.7
SALEM, ET AL. (CITIES), OR	01380/03	1.020	0.927	0.094	10.1
BROWNSVILLE, TX	00900/10	0.870	0.777	0.093	12.0
ST JOSEPH, MO	00740/01	0.949	0.858	0.091	10.6
SANTA BARBERA, CA	02050/16	1.129	1.040	0.089	8.5
REST OF OREGON	01380/99	1.031	0.946	0.085	9.0
HAWAII	01120/01	1.122	1.039	0.083	8.0
TYLER, TX	00900/27	0.974	0.895	0.079	8.8
MIDLAND, TX	00900/23	1.050	0.972	0.078	8.0
NORTH IDAHO	05130/12	0.906	0.829	0.077	9.3
SOUTH IDAHO	05130/11	0.927	0.850	0.077	9.0
SW OR CITIES (CITY LIMITS)	01380/12	0.983	0.907	0.077	8.5
PHOENIX, AZ	01030/01	1.055	0.982	0.073	7.4
BEAUMONT, TX	00900/20	0.972	0.899	0.073	8.1
ORANGE, TX	00900/25	0.972	0.899	0.073	8.1
Largest Decreases					
NORTHERN NJ	00860/01	1.082	1.214	-0.132	-10.9 %
ATLANTA, GA	01040/01	0.971	1.072	-0.101	-9.4

TABLE 4-5 (continued)

MEDICARE PAYMENT LOCALITIES WITH LARGE DIFFERENCES BETWEEN THE GPCI EMPLOYEE WAGE INDEX AND THE PPS WAGE INDEX (a)

Locality Name	Carrier/ Locality	1988 PPS Wage Index	Updated GPCI Index	Difference	Percent Difference
SOUTHWEST CT	10230/02	1.216	1.310	-0.094	-7.2
LAFAYETTE, LA	00528/06	0.811	0.894	-0.083	-9.3
NEW ORLEANS, LA	00528/01	0.897	0.979	-0.082	-8.4
DC + MD/VA SUBURBS	00580/01	1.107	1.189	-0.082	-6.9
SOUTH & E. SHORE MD	00690/03	0.941	1.022	-0.081	-7.9
SOUTHERN MAINE	21200/03	0.899	0.978	-0.079	-8.1
LAKE CHARLES, LA	00528/04	0.847	0.926	-0.078	-8.5
REST OF MISSISSIPPI	10250/01	0.711	0.789	-0.078	-9.9
REST OF LA	00528/50	0.773	0.848	-0.074	-8.8
SOUTHEAST AL	00510/03	0.753	0.826	-0.074	-8.9
DALLAS, TX	00900/11	0.947	1.020	-0.072	-7.1
DENTON, TX	00900/12	0.947	1.020	-0.072	-7.1

(a) more than a seven percentage point gain or loss

Note: MSA Data.

5.0 FINAL EMPLOYEE WAGE INDICES

After reviewing the earlier analyses in this report, the Health Care Financing Administration (HCFA) made the following decisions:

- the clerical portion of the employee wage index should continue to be based on wages of administrative support personnel in all industries, not non-manufacturing industries only;
- county-specific earnings should be used within large metropolitan areas (CMSAs) rather than metropolitan area earnings; and
- median hourly earnings rather than mean hourly earnings should continue to be used.

In addition, HCFA decided that the GPCI should be weighted by relative value units or RVUs (practice expense RVUs in the case of the employee wage index) rather than by population. Weighting by RVUs has two advantages. First, county RVUs identify the counties where Medicare services are provided more accurately than county population. The GPCI should be weighted to reflect input prices in the locations where services are performed. Second, weighting by RVUs assures that aggregate Medicare Fee Schedule payments for practice expense will not change if the payment locality configuration is altered (e.g., if a state with multiple localities becomes a single statewide locality). The differences between the RVU-weighted employee wage index and the population-weighted employee wage index are shown in Appendix I-2, where payment localities are ranked in descending order of the difference in the two indices.[4] The change in the employee wage index from RVU-weighting ranges from a 3.6 percent increase in South Dakota to a 5.5 percent decline in the "rest of Oregon" locality.

The 1996 updated employee wage index differs from the 1992 employee wage index in the following respects:

[4]The weight affects the computation of the wage index in two places. The first is in normalizing county hourly earnings by national average hourly earnings. For the final employee wage index, the national average is weighted by practice expense RVUs rather than by population. This has the effect of scaling each payment locality's index up or down by the same proportion. The second effect occurs in taking a weighted average of county or county part values to form an index value for a payment locality. For the final employee wage index, this average is weighted by practice expense RVUs rather than by population. This change affects each locality's index according to the difference in distribution among counties/county parts of RVUs versus population, and the difference among counties/county parts of hourly employee earnings.

- based on 1990 Census earnings data rather than 1980 Census data;
- reflects OMB's June 1993 redefinitions of metropolitan areas;[5]
- RVU-weighted rather than population-weighted;
- workers are classified by place of work everywhere rather than place of residence outside of large metropolitan areas;[6] and
- county-specific earnings, rather than metropolitan area earnings, are measured within large metropolitan areas (CMSAs).

Of these changes, the use of the more recent 1990 Census earnings data has by far the largest overall effect on the employee wage index.

After the original computation of the 1996 practice expense GPCI, HCFA actuaries determined that it would have to be rescaled to achieve "budget neutrality", that is, to ensure that aggregate payments to physicians are not affected by updating the GPCI. The practice expense GPCI was therefore multiplied by the factor 1.00125 and rounded to three decimal places. Since the practice expense GPCI is a linear combination of the employee wage and office rental indices (plus a constant representing the share of supplies, equipment, and miscellaneous in practice expenses), rescaling the practice expense GPCI in effect rescales the employee wage index by the same factor. In Appendix I-3, we show the 1996 employee wage index, the rescaled 1996 employee wage index (the 1996 index multiplied by 1.00125), and the 1992 employee wage index, by Medicare payment locality.

Appendix I-4 ranks Medicare payment localities by descending order of difference between the 1996 rescaled employee wage index and the 1992 employee wage index. The changes from updating are significant. Twenty seven of the 216 localities experience more than a 5 percentage point increase and 79 experience more than a 5 percentage point decrease in their index values. The largest increase is 24 percentage points, for South Central Connecticut; the largest decrease is 18 percentage points, for Peoria, Illinois. Many of the largest gainers are in New England, and many of the largest losers are in the Midwest. It should be remembered, however, that the employee wage index accounts for only about 16 percent of the overall Medicare Geographic Adjustment Factor (GAF). Thus, even the largest

[5]Although the employee wage index is ultimately calculated for Medicare payment localities, the underlying earnings data is tabulated by the Census Bureau for metropolitan areas and the nonmetropolitan portions of states before it is crosswalked to localities.

[6]In computing the 1992 employee wage index with 1980 Census data, for sample size reasons, workers were classified by place of residence outside of Consolidated Metropolitan Statistical Areas. This was not necessary with the 1990 Census data.

changes in the employee wage index imply less than a 4 percent change in Medicare fees in any payment locality.

REFERENCES

American Medical Association, 1989, Physician Marketplace Statistics 1989, Chicago, IL: Center for Health Policy Research.

American Medical Association, 1991, Physician Marketplace Statistics 1989, Chicago, IL: Center for Health Policy Research.

Dayhoff, D., J.E. Schneider, and G.C. Pope, 1994, Updating the Geographic Practice Cost Index: Revised Cost Shares. Final Report to the Health Care Financing Administration under Contract No. 500-89-0050.

Physician Payment Review Commission, 1991, Annual Report to Congress. Washington DC: Physician Payment Review Commission.

Physician Payment Review Commission, 1992, Annual Report to Congress. Washington, DC: Physician Payment Review Commission.

U.S. General Accounting Office, 1993, Medicare Physician Payment: Geographic Adjusters Appropriate But Could be Improved with New Data. GAO Report GAO/HRD-93-93.

Zuckerman, S., W.P. Welch, and G. Pope, 1987, The Development of an Interim Geographic Medicare Economic Index. Report to the Health Care Financing Administration under Grants No. 18-C-98326/1-01 and 17-C-98758/1-03.

PART II:

OFFICE RENTAL INDEX

PART II: OFFICE RENTAL INDEX

1.0 INTRODUCTION

1.1 Background on the Office Rental Index

In Medicare's Geographic Practice Cost Index (GPCI), relative prices by area are determined for four practice inputs: physician time, nonphysician employee wages, malpractice insurance premiums, and office space. The index of office rental prices is a component of the practice expense GPCI. Because of the unavailability of valid and reliable physician or commercial office rental data for each physician payment locality, relative residential apartment rents have been used to proxy relative physician office rents (Welch, Zuckerman, and Pope, 1989). Specifically, the residential rental series employed is the "fair market rent" (FMR) for a four bedroom apartment established by the Department of Housing and Urban Development (HUD). The FMRs are used in the Section 8 rental subsidy program. 1987 FMRs were used to establish the rental index used in the current (1992) practice expense GPCI. An adjustment for the New York City area was made because residential rent control may make relative residential rents inaccurate measures of relative commercial rents in New York City. The New York City FMR was replaced with the FMR of the Bergen-Passaic, New Jersey area. This was the highest FMR within the New York-Northern New Jersey-Long Island consolidated metropolitan area.

1.2 Criticisms of the Rental Index

The rental index has generally been regarded as accurate. Nevertheless, certain shortcomings or limitations of the FMR proxy have been recognized:

1. It is based on residential rents, not physician office or commercial rents (PPRC, 1992).

2. The New York City FMR may be an inaccurate proxy for relative commercial rents because of residential rent control in New York City. Using northern New Jersey (Bergen-Passaic) as a proxy for New York City is fairly arbitrary. Physician office rents in Manhattan may be higher than in northern New Jersey (Schmitz, 1991).

3. There is only a single FMR for each metropolitan area. But substantial differences in rents may exist within some metropolitan areas (PPRC, 1992). For example, Manhattan may have much higher rents than the Bronx (Schmitz, 1991).

4. The 1987 FMRs need to be updated.

5. The FMRs for a single year may be misleading because a given area may be in a recession or boom period. A three-year moving average may be a better measure of the long-run, or typical, rents in an area.

6. Two studies have compared the FMR proxy to office cost per square foot reported on the AMA's physician survey (Gillis *et al.*,1993; Zuckerman *et al.*, 1992). They have found that actual office expenses vary less than proportionally with the FMR proxy. This implies that the FMR proxy may be too high in large cities, and too low in rural areas.

We will address each of these criticisms in Part II of this report.

1.3 Overview of Part II of the Report

The next chapter reviews data sources that can be considered for use in constructing the office rental index. A discussion of the FMRs is included. We conclude that, although imperfect, the FMRs remain the best available data for computing the office rental index. However, an expensive primary data collection effort arguably could improve on the FMRs; we make some comments on collection of physician or commercial office rents.

Chapter 3 describes four alternatives we computed to update and refine the office rental index. They are:

(1) Single most recent year (1993) of FMRs;

(2) Three-year average (1991, 1992, and 1993) of FMRs;

(3) Single most recent year (1993) of FMRs with county-specific rents in large metropolitan areas; and

(4) Two versus four bedroom FMRs.

The rationale for each of these alternatives is described, along with methods of computation, and Medicare payment localities experiencing large changes from the baseline 1987 FMR index.

Chapter 4 focuses on the New York City area. There are two important issues concerning the New York City office rental index. First, as described above, the FMR for New York City may be an inaccurate indicator of relative physician office rents because of residential rent control there. What is an appropriate rental index for New York City as a whole? Second, it has been alleged that rents vary considerably by borough within New York City. Is this true, and if so, can intra-New York City adjustments be made in the office rental index? In Chapter 4, we evaluate several alternatives for New York City area rental indices.

Chapter 5 presents a validation of the FMR proxy using the 1988 HCFA Physician Practice Costs and Income Survey (PPCIS). The PPCIS collected self-reported physician office expense per square foot for a sample of approximately 3,000 doctors. We make some descriptive comparisons of relative FMRs and PPCIS cost per square foot by urban-rural, region, and metropolitan area. We also use regression analysis to estimate the overall degree of correlation and proportionality between the FMRs and PPCIS cost per square foot. We conclude that expense per square foot varies less than proportionally with the FMRs, but that this may not indicate any fundamental problem with the FMRs as the basis of the office rental index.

Chapter 6 discusses the final office rental index chosen by the Health Care Financing Administration based on the earlier analyses contained in this report. This index will be used for payment in the 1996 practice expense GPCI. The final (1996) rental index is based on the final fiscal year 1994 FMRs published by HUD in the Federal Register on April 6, 1994. These FMRs incorporate HUD's benchmark revision using the 1990 Census, and also incorporate the Office of Management and Budget's June 1993 metropolitan area redefinitions. The final office rental index is weighted by practice expense relative value units (RVUs) rather than by population.

Appendix II-1 shows the alternative office rental indices discussed in Chapter 3 by Medicare payment locality.[1] These indices were constructed using 1991, 1992, and 1993 FMR data, before the 1994 FMRs, and RVU weighting factors, were available. They do not reflect OMB's June 1993 metropolitan area redefinitions, and they are population weighted. Thus, they are not strictly comparable to the final payment indices discussed in Chapter 6 or shown

[1]Except for the two versus four bedroom FMRs contrasted in Section 3.3.4. These two indices were calculated with FY 1994 FMRs published on October 1, 1993. They reflect OMB's June 1993 MSA redefinitions, but are weighted by population. They are not directly comparable to the final payment index (Chapter 6), nor to the other rental index variants discussed in Chapter 3, but the differences are not major.

in the following appendices. However, the differences between the 1993 and earlier indices and the final indices based on the 1994 FMRs are not large and do not affect the conclusions of the analyses in this report.

Appendix II-2 shows differences between the final 1996 rental index weighted by RVUs and by population for each payment locality. Appendix II-3 displays the office rental indices used in the final (1996) practice expense GPCI. Appendix II-4 ranks payment localities by descending order of difference between the 1996 (updated) and 1992 (current) office rental indices.

2.0 REVIEW OF DATA SOURCES FOR OFFICE RENTAL INDEX

This chapter surveys data sources that are candidates for use in the office rental index. Several previous data searches and evaluations have been conducted. These are reviewed in Section 2.1. Section 2.2 then evaluates four private-sector sources of information on commercial office rents by city. Sections 2.3, 2.4, and 2.5 describe three government sources of commercial rents--IRS business tax returns, General Services Administration rental surveys, and U.S. Postal Service rental information. The Department of Housing and Urban Development (HUD) Fair Market Rents (FMRs) are discussed in detail in Section 2.6. Finally, primary data collection is considered in Section 2.7, and some conclusions are offered in Section 2.8.

2.1 Previous Data Searches

Zuckerman, Welch, and Pope (1987) identified three sources of rental information: the Building Owners and Managers Association (BOMA) Experience Exchange Report, the Institute for Real Estate Management (IREM) annual report, and the HUD FMRs. The authors concluded that the BOMA and IREM reports did not have the geographic coverage or sufficient sample sizes of buildings to be used for the office rental index. The HUD FMRs, on the other hand, were recommended for the GPCI index and comprise the current index. Each of these three sources is evaluated in greater detail below.

Dayhoff and Pope (1990) compared the HUD FMRs with commercial rents tabulated by BOMA and the Office Network, and with land prices and a construction cost index. They found that the HUD apartment rents were fairly highly correlated with these alternative measures, but that the degree of variation differed among the measures. Apartment rents are more variable than land prices/construction costs, but less variable than office rents reported by BOMA or the Office Network. The alternatives to the FMRs were only available for a limited number of areas. Dayhoff and Pope concluded that the HUD FMRs, while imperfect measures of physician office rents, were superior to any of the alternatives.

Zuckerman, Miller, Wade, and Pauly (1992) recently evaluated data sources for the office rental index. They concluded that no source of commercial rents had the necessary geographic coverage or accuracy required for the GPCI index. Several sources of residential rents exist: the HUD FMRs and median gross rents for renter-occupied units as tabulated by the Bureau of the Census. However, unlike the FMRs, the latter data does not control for

apartment size, and is also based on the entire rental distribution, not just rents paid by recent movers. Thus, the FMRs are the best source of residential rents available. Overall, Zuckerman *et al.* conclude that the FMRs remain the best data for use in the GPCI index.

2.2 Review of Private Sources of Commercial Office Rents

There are several private sources of office rental rates. Typically, these sources of information are used by building owners, managers, real estate brokers, and real estate agents to indicate current market conditions. The published material usually contains vacancy rates and price per square foot of space (residential, office, or industrial). Four sources will be described and evaluated in this section:

- Building Owners and Managers Association (BOMA)
- Institute of Real Estate Management (IREM)
- Society of Industrial and Office Realtors (SIOR)
- The Urban Land Institute (ULI)

These organizations are well-known in the real estate industry and are the only sources that cover a broad range of geographic areas, although none of them reports data for all metropolitan areas or any non-metropolitan areas. They are also the only sources that are produced regularly (annually). Other reports may be useful only for analysis of specific cities or types of buildings.

2.2.1 Building Owners and Managers Association

BOMA International is a private association that publishes information of concern to the office building industry. Of particular interest is BOMA Experience and Exchange Report: Income/Expense Analysis for Office Buildings. Published annually, the report tabulates operating income and expense data gathered from over 4,700 building owners and managers belonging to BOMA. National results are presented according to type of building, such as age, height, size, agency managed, single/multiple purpose, and primary use (e.g., financial, medical). Results are also presented by major U.S. city. However these tabulations distinguish only location (downtown versus suburban) and building size within downtown areas. A total of 105 U.S. cities are represented. The number of medical office buildings

reporting for the entire nation was 37 downtown and 101 suburban. The number of buildings reporting in each of the cities ranged from 2 to 98.

BOMA rents are reported as "gross rental income," which includes income such as parking fees, and are in dollars per square foot of rentable area. BOMA tables show the number of buildings reporting, the mean and median rent per square foot, and the range (low, high). BOMA also reports estimates of the costs of selected components of the operation of office buildings, such as cleaning, maintenance, utilities, and administrative. These costs are also reported per square foot of space.

The national mean office rent, including both downtown and suburban, was reported to be $16.87 in 1992 (1991 data). The median rent was $13.28. For medical office buildings located downtown, the national mean rent was $19.77, and the median rent was $14.40. For medical buildings located in suburban areas of major cities, the mean office rent was $15.66 and the median was $14.92. For BOMA mean rents for selected cities, refer to Table 2-1.

2.2.2 Institute of Real Estate Management

The Institute of Real Estate Management (IREM) produces a report similar to BOMA's called the Income and Expense Analysis. IREM publishes data for several types of buildings; we will discuss only office buildings. IREM annually collects information from 29 downtown metropolitan areas and 55 suburban metropolitan areas. Data are also reported for the entire U.S. and by building size and age (medical buildings are not broken out separately). The sample frame is all Certified Property Managers (CPMs), which is a certification granted by IREM.

IREM collects information from building managers on rental income per square foot and expenses per square foot. In IREM's report, information is reported as a median, based on one or more buildings in a metropolitan area. For rental income, respondents are asked to report the "sum of all rents which could have been collected if 100 percent of your building had been occupied." The overall median office rent reported by IREM in 1992 (1991 data) was $14.16 for all downtown buildings (n=491) and $12.26 for all suburban buildings (n=1066) (Table 2-1).

TABLE 2-1

MEAN OFFICE RENT IN DOLLARS PER SQUARE FOOT, 1991: SELECTED AREAS

City	BOMA				IREM (h)				SIOR				ULI			
	Downtown		Suburban		Downtown		Suburban		Downtown*		Suburban*		Downtown		Suburban	
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Atlanta	$13.7	21	$13.2	79	$13.8	18	$14.8	47	$22.1	--	$20.7	--	$24.5	--	$23.0	-- (f)
Boston	24.3	43	17.4	36	17.2	10	16.0	12	24.0	--	16.0	--	24.0	--	19.5	--
Chicago	22.0	95	15.8	80	18.1	18	15.0	23	33.6	--	25.8	--	27.0	--	21.0	-- (f)
Denver	10.6	30	11.9	55	10.0	9	11.6	36	13.1	--	14.8	--	12.0	--	16.5	-- (f)
L.A. - Central	22.3	32	20.0	98 (b)	21.0	19	17.4	28 (b)	29.5	--		-- (c)	23.1	--	19.5	-- (b)
L.A. - Orange	--	--	16.9	54	--	--	16.1	14	21.7	--	20.4	-- (c)	--	--	19.1	--
L.A. - San Bernardino	--	--	--	--	--	--	--	--	18.7	--	17.9	--	20.3	--	20.3	-- (d,f)
L.A. - San Fernando	--	--	--	--	--	--	--	--	--	--	26.5	--	--	--	--	--
L.A. - San Gabriel	--	--	--	--	--	--	--	--	--	--	21.0	--	--	--	--	--
L.A. - South Bay	--	--	--	--	--	--	--	--	--	--	22.3	--	--	--	--	--
L.A. - West	--	--	--	--	--	--	--	--	--	--	31.8	--	--	--	--	--
Long Island (Nassau/Suffolk)	--	--	--	--	--	--	--	--	--	--	23.8	--	15.0	--	25.0	--
Miami	19.3	17	14.7	26	--	--	--	--	26.0	--	18.0	--	26.5	--	20.8	-- (f)
New Jersey - Central	--	--	13.2	13 (a)	--	--	--	--		--	20.5	--	--	--	--	--
New York	29.4	45	19.1	8	--	--	--	--	36.1	--	--	--	35.6	--	--	--
Newark (Northern NJ)	--	--	14.1	14	--	--	--	--	--	--	21.3	--	24.0	--	26.0	--
Oakland	14.9	14	15.6	25	--	--	--	--	23.0	--	--	-- (c)	(e)	--	(e)	--
Philadelphia	18.7	42	18.8	55	16.3	16	14.1	6	23.4	--	18.5	--	30.0	--	25.0	-- (d)
Phoenix	12.7	26	10.4	47	10.9	9	12.8	23	17.8	--	16.4	--	25.5	--	22.5	-- (d,f)
Sacramento	21.1	4	16.2	12	--	--	14.2	8	27.0	--	20.4	--	26.4	--	21.6	-- (d)
San Francisco	23.3	79	19.9	14	20.7	14	18.0	8	24.1	--	20.5	--	28.0	--	21.0	-- (f)
Stamford	29.4	8	21.1	5	--	--	--	--	22.0	--	--	--	--	--	--	--
Washington, D.C.	27.9	50	22.6	53	22.9	54	19.2	87	30.9	--	21.9	--	33.5	--	23.0	-- (f)
Westchester County, NY	--	--	--	--	--	--	--	--	23.0	--	20.0	--	23.5	--	20.5	-- (f)
ALL U.S. BUILDINGS	16.9	3245	--	-- (g)	14.2	491	12.3	1066	--	--	--	--	--	--	--	--
ALL U.S. MEDICAL BUILDINGS	19.8	37	15.7	101	--	--	--	--	--	--	--	--	--	--	--	--

gpci\pracexp\rent\TAB2-1.XLS

NOTES:

* SIOR distinguished between "Class A" and "Class B" rents in the downtown and suburban areas. "Class A" rents are included here.

(a) BOMA rents are for Camden, NJ, not all of Central NJ.

(b) BOMA, ULI, and SIOR rents are for all of Los Angeles, excluding Orange county.

(c) SIOR rents for L.A. - Central, L.A. - Orange County, and Oakland are not weighted averages.

(d) SIOR rents for San Bernardino, Philedelphia, Phoenix, and Sacramento are from the the Development Markets / Office Rents section of the report.

(e) SIOR's Oakland rents are included with San Francisco.

(f) ULI rents reported as ranges were averaged for this table.

(g) BOMA does not distinguish between downtown and suburban in its calculation of an overall U.S. average rent.

(h) IREM reports medians only.

SOURCES:

1992 Building Owners and Managers Association (BOMA) Experience Exchange Report; Society of Industrial and Office Realtors (SIOR) 1992- Comparative Statistics of Industrial and Office Real Estate Markets; Urban Land Institute (ULI) - Market Profiles 1992; and Institute of Real Estate Management (IREM)- 1992 Office Buildings.

2.2.3 Society of Industrial and Office Realtors

The Society of Industrial and Office Realtors (SIOR) publishes an annual report entitled Comparative Statistics of Industrial and Office Real Estate Markets. The report is compiled for SIOR by Landauer Associates, Inc., an international real estate consulting firm. Landauer collects data by surveying 150 real estate agencies nationwide. This is an important distinction from the surveys done by BOMA and IREM, which survey building managers. Reported figures are based on responding agencies' own "experience and transactions" in the given geographic market. A total of 109 metropolitan areas are represented. No separate tabulations are shown by building characteristics.

Rents are reported for Class A or Class B office space and for space within or outside of the boundaries of the central business district. The real estate agencies responding to the Landauer survey are asked to report a low, high, and an average rent weighted by the amount of vacant space available at the rental rate. Also collected are sales prices per square foot. The number of respondents and the number of buildings in each area are not reported. Table 2-1 shows SIOR mean office rents for selected U.S. cities.

2.2.4 The Urban Land Institute

The Urban Land Institute (ULI) each year publishes Market Profiles, which reports average office rents and operating expenses for 35 metropolitan areas. The ULI data is collected in the same manner as the SIOR data-- each market area is described by a different reporting agency. In addition to reporting mean lease rates (dollars per square foot) and mean land prices (also per square foot), the ULI report describes each market area's development climate and market conditions for residential, retail, office, industrial and hotel markets. Table 2-1 shows ULI mean office rents for selected U.S. cities.

2.2.5 Limitations of Private Commercial Rental Data

The principal limitations of the sources of commercial rental data for the GPCI office rental index are:

- Discussions with real estate professionals indicate that these sources reflect only corporate office space whereas physicians often locate in residential space (Appendix II-B).

- Sample sizes for each city are very small, which make reported rents highly sensitive to the particular buildings or agencies that happen to report. In addition, it is unlikely that a small number of buildings can adequately represent the average rents of an entire area.

- The sampling frame used for these surveys may not reflect the "average" building; that is, buildings managed by those belonging to professional associations may have characteristics different from other buildings.

- It is likely that building managers choosing to respond to the surveys manage buildings that have characteristics different from non-responding buildings. The result is that the data under-represent non-responding buildings.

- None of the commercial rental sources collect data for non-metropolitan areas, nor do any of them collect data for all metropolitan areas. City-specific rents are available mostly for large metropolitan areas.

- It is not clear whether respondents are reporting "transaction" rent (the rent they actually collect) or "asking" rent (the rent they would collect if (a) the space were occupied; or (b) they did not discount their asking price).

Given their ad hoc methods, the lack of consistency in published rents across sources is not surprising (Table 2-1). For example, reported downtown Chicago office rents vary from a high of $33.60 per square foot (SIOR) to a low of $18.10 (ULI), a 46 percent difference. For Philadelphia, ULI reports an average downtown rent of $30, compared to $16.30 reported by IREM (however the IREM reports a median and ULI reports a mean). Comparing BOMA and ULI, which both report means, mean office rent in downtown Atlanta is $13.70 according to BOMA and $24.50 according to ULI, an 80 percent difference. These differences are probably due to small sample sizes, variation in data collection methodology, and the non-randomness of the sample of buildings.

It is important to emphasize how small the samples are for many of the areas. For example, for BOMA the number of downtown reporting buildings for Sacramento was only four (Table 2-1). For suburban New York City, BOMA reports data based on only eight buildings. IREM based suburban estimates for Philadelphia, Sacramento, and San Francisco on eight buildings or fewer. Compounding the small sample size problem for the BOMA and IREM surveys is that one respondent can report for a number of buildings. In an area where a small number of buildings report, the results can be strongly influenced by the experience of a single building owner or manager. Although data for SIOR and ULI are not

collected using the same methods as BOMA and IREM, they are susceptible to similar problems--the experiences of one agency determines the average rent. It is highly probable that different data collection methods were used for each market area, and the documentation does not reveal the different methods used by the individual agencies.

Because of the seriousness of these limitations, we do not believe commercial office rent data is an appropriate basis for the office rental index, nor is it of any significant use in validating the index. Schmitz (1991) uses the SIOR data to examine New York City area rents. Schmitz concluded that the GPCI rental index is as much as 40 percent too low for New York City, and that Manhattan office rents are higher than in other boroughs. Although we agree with Schmitz's finding that rents in Manhattan are higher than in the other New York City boroughs (see Chapter 4), we do not find Schmitz's use of the SIOR data to be sound. The realtor who reports SIOR rents for New York City does not believe the SIOR data is an accurate indicator of physician office rents there (see Appendix II-B). As is true of the other commercial rental sources, SIOR primarily measures rents for corporate office space, whereas physicians in the New York City area typically locate in residential space. Appendixes II-A and II-B contain further discussion of the New York City area rents reported by the commercial rental sources.

2.3 Internal Revenue Service Tax Returns

Physician offices report deductible business rental expenses on their tax returns. These data could possibly be used to measure physician office rents by area. GAO and HCFA have entered into an agreement with the IRS Statistics of Income Division to obtain rental expenses reported on sole proprietorship, partnership, and corporation 1991 tax forms of medical doctors, osteopaths, dentists, chiropractors, optometrists, and podiatrists. (The statutary definitions of Medicare physicians include these additional practitioners.)

The advantages of the IRS data are that they are actual expenses from physician offices, they should be accurate since inaccuracy in filing tax returns is subject to criminal penalties, and they should be available at a much lower cost than a new effort to collect physician office rents. However, the IRS data suffer from several serious drawbacks. First, rental expenses reported for tax purposes includes equipment lease costs, not just office space. Second, square feet of office space is not collected on tax returns. Thus, a rental cost per square foot cannot be calculated. An alternative standardization for size of practice might be number of FTE employees in a practice. Unfortunately, the number of employees

that is reported with quarterly FICA payments does not distinguish between full- and part-time workers. Third, confidentiality of tax returns might restrict small area analysis. The sample size available from the IRS data is not clear at this time. Fourth, no information on the detailed specialty of doctors of medicine is available. If rental cost per square foot varies by specialty (e.g., internist versus surgeon), and specialty mix varies by area, the IRS measure could be biased.

HCFA and the GAO have acquired state level data reporting rental expenses for partnerships and corporations. However, with no method of adjusting for practice size, it is impossible to compare per unit costs across practices. (No rental data for sole proprietorships was provided.) A more extensive data request has been placed with the IRS to provide information including number of employees. This is expected to be available in October 1994. Further evaluation of the tax return information can take place at that time.

2.4 General Services Administration Rental Survey

Every five years, the General Services Administration (GSA) conducts a survey of the rents (cost per square foot) paid for buildings it controls across the country. Utilities are included in the rents. Approximately 27,000 buildings are currently included in the survey, representing both urban and rural areas. Rents are available by city.

The GSA has provided HCFA with a file containing average rents by city. Average rents were calculated by dividing total rent for buildings within the city by total square feet; thus, they can be thought of as average rent per building, weighted by building size. The file also contains average rents by county, calculated in an analogous manner.

This survey has several shortcomings for use in calculating a national rental index for use in the GPCI. First, some GSA-rented space--for example, warehouses--may not be representative of physician office rents. Since we have no information on individual buildings we cannot exclude those with extremely high or extremely low rents that may be indicative of buildings of different types. Second, the mix and location of GSA-rented buildings may vary substantially from area to area. For example, if buildings in one county were all prime office space and buildings in another county were all warehouses, an index based on the GSA data would be biased.

A third shortcoming of the GSA data is that unlike the HUD FMRs, GSA rents are not available for all counties. In fact, 33 percent of all urban counties and 69 percent of all rural counties are not represented in the GSA rental data. Finally, although the file contains

information on over 27,000 buildings, five urban counties contain one third of all the buildings in the sample. As a result of this concentration, sample sizes are quite low in many areas. For example, among rural counties that are in the data, the median sample size is one building.

Given these limitations, the GSA data are not a viable option to replace the FMRs for the GPCI rental index. However, they may be useful for validation of relative rents in areas for which GSA has a large sample of buildings. Health Economics Research, Inc. (HER) is currently evaluating the potential use of these data to validate the GPCI rental index.

2.5 U.S. Post Office Rental Data

HCFA has acquired a file from the U.S. Postal Service containing cost and square footage data on roughly 35,000 buildings nationwide. The majority of these buildings (over 28,000) are rented by the Post Office; data for these buildings include the date the lease was effective, interior square footage of the building, annual rent, and building location (zip code). The remainder of the buildings, which are owned by the federal government, cannot be used in construction of an office cost index since the purchase price reflects economic conditions at the time of purchase, rather than current conditions.

Several characteristics of the Post Office data make them more promising than the GSA data. First, the file contains data on individual buildings, rather than citywide averages. Thus, data can be examined for outlier values that may be inappropriate to include in the analysis. For example, a small proportion of buildings were coded as containing zero square feet of space. These can be removed from the data before calculating an areawide average cost per square foot. Second, although the GSA and Post Office data files contain roughly the same number of buildings, the post office buildings are not heavily concentrated in a few geographic areas. As a result, sample sizes in most areas are larger than those found with the GSA data. Third, the data contain the starting date for the lease on each building. Thus, buildings with less recent leases, which are less likely to reflect the current relative rents across areas, can be excluded from the sample.

Despite these advantages relative to the GSA data, the post office data does not seem a viable alternative to replace the HUD FMRs in the GPCI rental index. Sample sizes for the post office data are much smaller than for the HUD FMRs, and the post office data do not include buildings in all counties. The post office data may, however, be valuable for

validating FMR relative costs for aggregate levels such as states or MSA-size classes. HER is currently pursuing analysis of these data.

2.6 Department of Housing and Urban Development (HUD) Fair Market Rents (FMRs)

2.6.1 General Description

The Department of Housing and Urban Development (HUD) annually publishes "fair market rents" (FMRs) to determine eligibility of rental housing units for the Section 8 housing program. HUD estimates FMRs for 339 metropolitan areas and 2,416 nonmetropolitan counties. When small sample sizes are a concern in rural counties, HUD groups them to achieve an aggregate population of 50,000 or more. FMRs are gross rent estimates, including all utilities except telephone. FMRs are defined as the 45th percentile of the rental distribution of standard quality rental housing units occupied by recent movers, excluding public housing and newly built units.

FMRs are based primarily on decennial Census data, American Housing Survey (AHS) data, Consumer Price Index (CPI) data, and Random Digit Dialing (RDD) surveys of rents. The data used to calculate a specific FMR depend on whether or not an area is covered by a special metropolitan AHS.

AHS surveys cover 44 of the largest metropolitan areas, which contain about half of all rental housing. The surveys are conducted on a four-year cycle, 11 areas each year. Outside these areas, FMRs are based on the decennial Census of Housing. Until recently, the FMRs were updated each year by the Consumer Price Index for rent and utilities. Separate CPIs are available for 74 metropolitan areas, and for the four Census regions. HUD is currently phasing in use of RDD surveys of rents in metropolitan and nonmetropolitan parts of the 10 HUD regions to replace the CPIs in updating the FMRs. RDD surveys will also be used to annually revise the FMRs of approximately 60 FMR areas (Federal Register, April 30, 1992, p. 18685).

HUD publishes FMRs for zero (efficiencies) to four bedroom apartments. Because there are more two-bedroom rental units than any other size in most housing markets, survey samples of two-bedroom units are larger and, therefore, produce more accurate rent estimates. HUD publishes FMRs in the Federal Register twice each year. Proposed estimates are usually published in mid-April; final estimates must be available for the federal fiscal year beginning on October 1. Public comments (usually from local public housing agencies) are received on about 100 of the proposed FMRs each year. To be considered for revision,

comments must include statistically valid rental housing survey data that justifies the recommended changes. FMRs are typically revised for about one-third of the areas on which comments are received.

2.6.2 Strengths of the FMRs for the GPCI Rental Index

The FMRs have been selected to proxy relative physician office rents in the GPCI (Zuckerman, Welch, and Pope, 1987). The FMRs have many compelling advantages. First, they are available for all areas using a consistent methodology. Second, they are available for relatively small areas (metropolitan areas or rural counties) that should capture most inter-area variation in rental costs. Third, they are updated annually. Fourth, they are based on large sample sizes of rental units from throughout metropolitan areas or counties. Thus, they should be more accurate than other sources derived from smaller samples of buildings, they should be representative of the entire area for which they are calculated, and they should represent a wide range of building types. Fifth, the FMRs control for rental unit size (through the number of bedrooms) and also make first-order corrections for building quality (substandard buildings and public housing units are excluded from calculation of the FMRs). Holding constant building size and quality reduces bias from comparing dissimilar rental units across areas. Sixth, the FMRs are based only on recent movers and so reflect current market conditions. Seventh, the FMRs are subject to public comment and revision. They are generally regarded as accurate indicators of local housing market conditions. Eighth, the FMRs include utility costs in addition to space rental. Ninth, the FMRs are readily available, allowing the office rental index to be produced relatively easily and inexpensively, greatly reducing administrative burden as opposed to, for example, primary data collection. Tenth, although the FMRs are based on self-reported data, respondents probably report accurately because most people have to pay their rent monthly and so are well aware of the amount. No other data source of which we are aware has all these advantages.

2.6.3 Weaknesses of the FMRs for the GPCI

Despite their impressive advantages, the FMRs do have some shortcomings for the office rental index. First, they obviously lack face validity since they measure residential apartment rents, not physician office rents. The use of the FMRs in the GPCI depends on the assumption that relative apartment rents are accurate indicators of relative physician office

rents. We were unable to locate any information or research on the general relation between residential and commercial rents (see, however, Chapter 5 for a validation of the FMRs against self-reported physician office costs per square foot). However, residential and office rents should be affected by the same factors--population density and income in particular--and so should be highly correlated. Experts at HUD agreed that residential and commercial rents should be closely related, especially in the long run.

Also, it should not be assumed that generic "commercial" rents are necessarily better indicators of relative physician office rents than residential rents. The commercial market is comprised of many submarkets: prime downtown corporate office space, suburban retail space, warehouse space, manufacturing space, etc. In many areas (e.g., New York City--see Appendix II-B) physician offices are located in residential areas and buildings, not commercial space.

Nevertheless, it cannot be denied that the residential and commercial rental markets are not identical and that some physicians locate in space that is more "commercial" (e.g., medical office buildings) than residential. The magnitude of any distortions in the office rental index resulting from the use of residential apartment rents is difficult to determine (again, see Chapter 5). Primary data collection of physician office rents on a small area basis may be necessary to conclusively settle this issue.

A second limitation of the FMRs is that they are available only for metropolitan areas as a whole. There is evidence of intra-MSA rental variation, especially for large, populous MSAs (see Chapters 3 and 4). HUD agrees that rents vary within MSAs, but feels that their mission and legislative mandate is to establish rents for market areas as a whole. HUD has allowed exceptions to the FMRs for certain areas within particular MSAs. Fortunately, data are available to adjust the FMRs by county within MSAs. We analyze sub-MSA rents in Chapters 3 and 4.

A third limitation of the FMRs is that they adjust imperfectly for variations in apartment quality across areas. As mentioned above, substandard buildings are excluded from calculation of the FMRs. However, no adjustments are made for building quality ranging from low-standard to luxury. Residential rents are often higher in wealthier suburban rings of major metropolitan areas than in poorer central cities, despite the higher population density in central cities. This is one reason HUD is reluctant to decompose the FMRs into sub-MSA areas. Presumably apartment quality is higher, on average, in wealthier MSAs and parts of MSAs. Wealthier areas may also have a generally more desirable living environment (e.g., less crime). Physician office rents may also be higher in higher income

areas. However, to the extent physician office space is more "standard" across areas than apartment space, relative apartment rents unadjusted for quality variations may not perfectly track relative physician office rents. HUD's use of the 45th percentile of rents should limit the effect of quality differences, since this percentile is less sensitive to a luxury "tail" of the rental distribution than, say, the mean rent.

2.6.4 Effect of Residential Rent Control on the FMRs

A fourth disadvantage of the FMRs is potentially the most serious, at least for some areas. This is residential rent control, which may cause relative residential rents to diverge from relative commercial rents. To assess the impact of rent control on the FMRs, we consulted HUD's Report to Congress on Rent Control, September, 1991.

About 10 percent of all rental housing in the United States is covered by rent control. However, "the majority of rent control ordinances appear to have small effects on average rent levels" (Report to Congress on Rent Control, p. vi). The most stringent rent control programs exist in Berkeley and Santa Monica, California, Brookline and Cambridge, Massachusetts, and New York City.

All these areas except New York City represent only a small proportion of their MSAs, counties, or Medicare payment localities. Berkeley comprises a small share of the Oakland MSA, which is used to establish the FMR for Berkeley's Medicare payment locality. (The locality is the same as the MSA.) Berkeley represents only about 5 percent of the population of this locality/MSA, and only about 8 percent of its county (Alameda) population. Santa Monica represents only 1 percent of the population of Los Angeles county, which is used to establish the office rental index for the eight Los Angeles localities. If rents within Los Angeles county were ever differentiated, Santa Monica's rent control might be more of a concern. The office rental index for Brookline and Cambridge Massachusetts is based on the Boston MSA FMR. Together Brookline and Cambridge comprise only 5 percent of the population of the Boston MSA. Brookline represents 9 percent of the population of its county, and Cambridge 7 percent--not much of a problem, even if Boston area rents are broken down by county.

Thus, New York City is the only area where residential rent control could significantly bias the FMRs utilized for the office rental index. Two rent control programs are in place in New York City. Only about 5 percent of rental units are affected by the older rent control program, which is estimated to lower rents below market rates by about 30 percent. The

45th percentile rent, on which the New York FMR is based, does appear to be affected by the less stringent "rent stabilization program." This program is estimated to reduce rents below market by about 11 percent (Report to Congress on Rent Control, pp. 15-16).

We conclude that residential rent control affects the FMRs to a modest degree in New York City, but nowhere else. Chapter 4 is devoted to evaluating alternative approaches to establishing the office rental index for the New York City area.

2.7 Primary Data Collection

Collection of actual physician office rents (cost per square foot) could potentially improve the accuracy of the office rental index. The Physician Payment Review Commission has called for a survey of commercial rents by the Department of Commerce or the Department of Housing and Urban Development (PPRC, 1992). In this section, we make several observations about primary data collection.

A primary data collection effort should focus specifically on office rents of physicians, not general commercial rents. The commercial rental market has several segments, some of which may be less related to physician office rents than residential rents are. For example, prime corporate office space utilized by law, advertising, financial firms, etc. should be excluded from the survey because physicians rarely locate in such space. To increase sample sizes, similar businesses could be grouped with physician offices. These would include dentists, optometrists, chiropractors, and osteopaths.

The type, and expense, of office space also varies among physicians. Physicians who perform many tests and procedures in their offices require extra plumbing, electrical, safety, etc. features that can substantially raise the cost per square foot. There is evidence that the number of tests and procedures performed in an office setting, and thus physicians' office cost per square foot, varies systematically across geographic areas (see Chapter 5). The GPCI is an input price index that is designed to measure the cost of a fixed basket of practice inputs across areas. Thus, reflecting regional site-of-service differences in the GPCI would be undesirable. (A service-specific adjustment for site of service can be incorporated into Medicare's physician fees, as HCFA has implemented in a limited fashion and the PPRC has proposed modifying and expanding.) A survey of physician office rents should collect sufficient information to adjust cost per square foot for differences in the expensiveness of construction arising from site-of-service differences.

A large sample size for the survey is essential. Rents can vary greatly within small areas and a broad representation of building locations and types is necessary to ensure the representativeness of the collected rents. It is likely that rents for tens of thousands of buildings would need to be collected on a national basis. IRS tax return records or the AMA Masterfile of physicians could be used to determine the sampling frame. It would be much less expensive to piggyback on existing data collection efforts--for example, the Census's Service Annual Survey or the IRS's Statistics of Income.

One alternative would be to expand a physician survey like HCFA's Physician Practice Costs and Income Survey (PPCIS) or the AMA's Socioeconomic Monitoring System (SMS). Cost per square foot of office space has been collected on both these surveys (see Chapter 5 below), but not with a large enough sample size for use in the GPCI. Judging from our analyses in Chapters 4 and 5, we would estimate that at least 100 completed physician responses per locality would be necessary to achieve an acceptably accurate rental index. If the 230 Medicare payment localities were collapsed into 100 larger geographic units, this would imply a sample size of 10,000. A sample size of 15,000 to 20,000 would be desirable to increase the index's accuracy, but would be quite expensive. Moreover, it would have to be repeated to stay abreast of changing market conditions. Of course, other information, such as on other practice input prices, could also be collected on a physician survey to increase its value per dollar spent.

An alternative would be to repeat a national survey such as the PPCIS, but oversample particular areas of concern such as New York City. An office rental index value for New York could be derived as the ratio of the New York median to the national median physician office expense per square foot. Oversampling in New York might only increase the survey sample size by several hundred. Another possibility would be for HCFA to contract with the AMA to oversample New York in their annual SMS survey.

A final alternative would be to mail a brief questionnaire requesting office expenses per square foot to all physicians on the AMA Masterfile. Even with the cooperation of the AMA, this approach might achieve a very low response rate. Moreover, respondents might not be a random sample of all physicians. Finally, if physicians were informed of the purpose of the survey, as presumably they would be, they would have an incentive to overreport their costs.

2.8 Conclusions on Data for the Office Rental Index

In our judgment, the HUD FMRs remain the best available source for constructing the office rental index. We recommend that HCFA incorporate the FY 1994 FMRs into the next revision of the GPCI because the FY 1994 FMRs will incorporate a major "benchmark" revision based on the 1990 Census and will also incorporate OMB's June 1993 metropolitan area redefinitions.

We believe that the IRS, GSA, and Postal Service rental data warrant further analysis. At this time, our judgment is that these data will be more useful to validate and refine the FMRs, rather than to replace the FMRs. They may be useful in establishing an office rental value for New York City.

If the various attempts to validate the FMRs as the office rental index indicate systematic biases, collection of primary data should be considered. We have discussed several possibilities in Section 2.7. Any primary data collection effort is likely to be quite expensive and may not improve on the FMRs. If new data needs to be obtained, piggybacking on current data collection efforts would be desirable, since new surveys would be expensive and would have to be repeated periodically. Less expensive pilot surveys could be undertaken to indicate the likelihood that a new survey would improve on the FMRs as the basis of the office rental index.

3.0 ALTERNATIVE OFFICE RENTAL INDICES

This chapter presents four alternatives for updating the current office rental index, which is based on the fiscal year (FY) 1987 HUD Fair Market Rents (FMRs). Given our conclusion in Chapter 2 that the FMRs are the best available data for the office rental index, all these alternatives are based on the FMRs. The alternatives are:

(1) Single most recent year (FY 1993) of FMRs;

(2) Three-year blend (FY 1993, 1992, and 1991) of FMRs;

(3) Single most recent year (FY 1993) of FMRs with county-specific rents for counties in Consolidated Metropolitan Statistical Areas (CMSAs); and

(4) Two-bedroom versus four-bedroom FMRs.

In Section 3.1, we present the rationale behind each of these alternatives. Section 3.2 describes our methods for calculating the office rental proxies. Section 3.3 then discusses which localities experience the largest changes in index values as a result of updating with the various alternatives. The FY 1993 FMRs were the most recent data available in time for our original analyses, and are used in options 1, 2, and 3 above. Option 4 was analyzed with the first version of the FY 1994 FMRs produced by HUD and published in the October 1, 1993 Federal Register. The final FY 1994 FMRs published by HUD in the April 6, 1994 Federal Register were used in the final 1996 practice expense GPCI computations.

3.1 Rationale for Office Rental Index Alternatives

3.1.1 Most Recent Single Year

Updating with the single most recent year of FMRs is the simplest alternative. It has the advantage of utilizing only the most recent data, and is HUD's best estimate of current market conditions. The most recent FMRs available for the analyses in this chapter were the FY 1993 FMRs.

3.1.2 Three Year Average

The annual FMRs are subject to abrupt changes as data from new rental surveys or other changes are incorporated. A multi-year average of FMRs should smooth out these

year-to-year variations and result in a more stable office rental index. We evaluate the most recent three-year average of FMRs available in time for our analysis: FY 1993, 1992, and 1991.

3.1.3 County-Specific Rents in CMSAs

A limitation of the FMRs is that only MSA-wide FMRs are established by HUD; no intra-MSA rental variation is captured. In smaller metropolitan areas this is probably not a significant shortcoming because rents are likely to be reasonably homogeneous across the entire metropolitan area. However, significant rental variation may exist within larger metropolitan areas. The third office rental index alternative establishes county-specific rents for counties within the larger metropolitan areas (Consolidated Metropolitan Statistical Areas, or CMSAs). Data from a HUD special tabulation of the 1990 Census is used to calculate the county specific rents, as described in more detail below. Otherwise, this option relies on the FY 1993 FMRs.

3.1.4 Two Versus Four Bedroom FMRs

HUD publishes FMRs annually by metropolitan area and nonmetropolitan county for the following apartment sizes: 0 bedrooms (efficiencies), 1 bedroom, 2 bedrooms, 3 bedrooms, and 4 bedrooms. Prior to the Fiscal Year 1994 FMRs, the FMRs for different bedroom sizes were all based on rental data for 2 bedroom apartments, which are the most common across the country. Rents for other bedroom sizes were a constant proportion of the 2 bedroom rents (less than 1.0 for smaller apartments and more than 1.0 for larger apartments). Since the rental index is based on the *relative* FMRs, which bedroom size was used made no difference in the index.

With the FY94 FMRs, however, HUD began basing the FMRs for different bedroom sizes on actual rental data from the 1990 Census and other sources. The FMRs for different bedroom sizes are no longer proportional, so it makes a difference which bedroom size is chosen for the GPCI rental index. The two most logical choices for the GPCI are the 2 or 4 bedroom FMRs. The current GPCI index is based on the FY 1987 4 bedroom FMRs, but the relative rents for this series are really derived from rental data on 2 bedroom apartments.

The rental index should be based on the 2 bedroom FMRs, for two reasons. First, the current GPCI rental index is really based on 2 bedroom rental data, even though it is

nominally based on 4 bedroom rents. Thus, using 2 bedroom rents is more consistent with what is currently being used in the GPCI and may lead to less change in the index when updating. Second, two bedroom apartments are the most common apartment type across the country, and have the largest sample sizes for measuring rental rates. In many areas, four bedroom apartments are much less common and four bedroom FMRs are based on much smaller sample sizes of rents, which may reflect, for example, an unrepresentative geographic distribution of rental units.

3.2 Methods Used to Calculate Alternative Office Rental Indices

All but one of the office rental indices were computed from the "history" file of FMRs supplied to us by the Department of Housing and Urban Development. The one exception is the FY 1987 FMR index, which is currently being used as the office rental index in the Medicare Fee Schedule. It was provided to us by the Urban Institute. Four bedroom FMRs are the basis of all the indexes, except the two bedroom index discussed in Section 3.3.4.

3.2.1 Create County File of FMRs

First we created a county file of FMRs, then we translated the county values to Medicare payment localities. FMRs were available for counties in all areas except New England, where MSAs are not county based. New England FMRs for MSAs and nonmetropolitan county parts were translated to a county basis using a MSA to county crosswalk. Where MSA borders crossed counties, county part FMRs were averaged using 1990 Census town population weights to form a county value.

For all but two metropolitan counties, HUD computes FMRs only for MSAs, not for constituent counties. Congress requires HUD to establish distinct FMRs for Westchester county, New York, which is part of the New York City PMSA, and Monroe county, Pennsylvania, which is part of the Scranton-Wilkes-Barre MSA. We retained the distinct Westchester FMR on our county file because it should accurately represent rents in that county, which is not subject to New York City rent control ordinances. The Monroe county FMR was replaced with the Scranton-Wilkes Barre FMR. HUD personnel informed us that the Scranton-Wilkes Barre FMR was calculated <u>including</u> Monroe county, although Monroe county has its own FMR. Thus, assigning Monroe county the FMR of its MSA treats it consistently with other metropolitan counties. Also, as a practical matter, the Monroe county

FMR was not established until 1992, so we could not calculate the three-year average proxy (1991-1993) for it.[1] HUD also computes a distinct FMR for Columbia city Maryland, part of Howard county. Originally, this exception was made because Columbia was part of the model cities program. We deleted Columbia city from our FMR file.[2]

3.2.2 Replace New York City FMR

Once the county file was complete, we assigned the Bergen-Passaic, New Jersey FMR to all counties in the New York City PMSA, including Westchester county. Westchester county's FMR was replaced so that it would have the same FMR as other counties in its PMSA, as do all other metropolitan counties. This is consistent with the current (FY 1987 FMR-based) GPCI, which uses the Bergen-Passaic FMR for Westchester county. (Westchester did not receive its own FMR until 1988.)[3]

3.2.3 Calculate County FMR Index

A national average of the county FMRs was taken, weighted by 1990 population. Although they are included on the file, Puerto Rico, the Virgin Island, and Guam were excluded from this national average, as they were in calculating the current (FY 1987) office rental GPCI.[4] A county-level office rental index was computed by dividing each county's FMR by the population-weighted national average.[5]

---

[1]For the FY 1994 FMRs, Monroe county Pennsylvania was classified as part of nonmetropolitan Pennsylvania and thus has its own FMR computed by HUD. We used this FMR rather than the Scranton-Wilkes Barre replacement. We continued to use the distinct Westchester county New York FMR.

[2]For the FY 1994 FMRs, HUD deleted 22 counties total from seven metropolitan areas defined by OMB in its June 1993 revision because HUD believed that these counties had substantially lower rents than the rest of their metropolitan areas. We used the FMR rents established by HUD for these 22 counties in the final 1996 rental index discussed in Chapter 6. See p. 51410 of the October 1, 1993 Federal Register.

[3]For the final 1996 office rental index (see Chapter 6), we used the actual HUD FMR for the New York City PMSA, rather than replacing it by the Bergen-Passaic FMR. See the discussion in Chapter 4. We also used the Westchester county FMR established by HUD for the office rental index used in the 1996 practice expense GPCI.

[4]Whether or not Puerto Rico and the other outlying areas are included in the national average has no effect on the final GPCI values because they are rescaled to ensure budget neutrality.

[5]The final office rental index used for payment is weighted by practice expense relative value units (RVUs) rather than population, as discussed in Chapter 6.

3.2.4 Translate County Index to Medicare Payment Localities

Finally, the county index was translated to Medicare payment localities using a crosswalk. Locality indexes are population-weighted averages of their constituent county indexes.[6] If a locality includes only part of a county, that county index is included in the locality average weighted by the population of the county part.[6] If a locality is entirely within one county, it is assigned that county's index.

3.2.5 Create County-Specific Rents in CMSAs

FMRs are produced only for MSAs, not individual metropolitan counties. We calculated rental index alternatives that account for rental variation by county within CMSAs. CMSAs are composed of smaller metropolitan area units called PMSAs, or Primary Metropolitan Statistical Areas. FMRs are defined for each PMSA.

Our strategy was to maintain the HUD FMR for each PMSA on average, but to capture differences in relative rents among counties in each PMSA. To measure intra-PMSA rental variation, we obtained a HUD special tabulation of 1990 Census data. This file includes residential apartment rents by county. To be consistent with the FMRs, we used the 45th percentile of the rental distribution of two bedroom apartments rented by recent movers. These rents were used to define the relative rent of each county within a PMSA. The population-weighted average of the county rents was set equal to the FMR produced by HUD for the PMSA as a whole. This approach was taken to maintain consistency with the FMRs outside of CMSAs, and also to allow easy updating of the rental index as HUD produces new FMRs for each PMSA annually. The relative rents by county obtained from the 1990 Census can only be updated every ten years, however, with a new decennial Census.

In New England, CMSAs and PMSAs are not county-based; instead, we employ New England County Metropolitan Areas (NECMAs). The Boston, Massachusetts, Hartford, Connecticut, and Providence, Rhode Island NECMAs are analogous to the corresponding CMSAs.[6] For the purposes of this analysis, we considered these three NECMAs to be CMSAs. Our approach requires a single FMR for each of these three NECMAs. (Rents

---

[6]In OMB's June 1993 metropolitan area redefinitions, Boston is the only New England metropolitan area to be considered a CMSA. Thus, for the final 1996 office rental index (Chapter 6), we used county-specific rents only in the Boston NECMA, not in the Hartford or Providence NECMAs.

within NECMAs may vary by county because HUD defines FMRs for MSAs, and MSAs may cross county lines in New England. In cases where an MSA crosses a county line, the county value is an average of the MSA FMR and the FMR of the nonmetropolitan part of the county.) Thus, before calculating the county-specific rents for the NECMAs, we computed a population-weighted average of the FMRs of all counties within each NECMA. Then we used the Census rents to define county rents in each NECMA relative to its average FMR.

3.3 Changes in the Office Rental Index From Updating

3.3.1 Single Most Recent Year: FY 1993 FMRs

Updating the office rental index with newer data results in substantial changes. Medicare payment localities experiencing more than a 5 percentage point gain or loss from updating to the FY 1993 FMRs are shown in Table 3-1. Of the 232 localities, 55, or nearly one-quarter, experience more than a 5 percentage point change. Twenty nine, or 13 percent, gain more than 5 percentage points, and 26, or 11 percent, lose more than 5 percentage points. Hawaii's index increases the most, by 24 percent. Four localities gain more than 20 percent and 11 more than 10 percent. Miami, Dallas, Seattle, and Washington, D.C. are among the biggest gainers.

Six localities lose more than 20 percent and 11 more than 10 percent. Reno, Nevada loses 29 percent, the most of any locality. Phoenix, New Orleans, urban Massachusetts, Detroit, and Oakland, California are among the largest losers. Changes in the FMRs may occur on a small area basis: Arizona and Texas localities are both among the largest gainers and the largest losers.

The magnitude of these changes is perhaps not surprising given the six year lag in updating between the FY 1987 FMRs and the FY 1993 FMRs. However, a number of the larger losers seem to be connected with the Random Digit Dialing (RDD) surveys instituted by HUD for the first time in FY 1993. Regional HUD field offices recommended areas with potential FMR problems, and RDD surveys were conducted for many of these areas. Most of the areas with the largest declines in FMRs between 1987 and 1993 were subjects of the RDD surveys (Federal Register, April 30, 1992, p. 18685).

OBRA 1990 requires a two year transition if the GPCIs are not updated annually. Therefore, the GPCI in the first year of updating will be a blend of the previous GPCI and the updated GPCI. If the FY 1993 FMRs were used to update the office rental index, implicitly an average of the 1987 and 1993 FMRs will be incorporated into the practice

TABLE 3-1

LOCALITIES EXPERIENCING LARGE CHANGES IN OFFICE RENTAL INDEX AS A RESULT OF USING 1993 FAIR MARKET RENTS (FMRs)[a]

Locality Name	Carrier	Locality	1987 FMR	1993 FMR	Change	Percent Change
Largest Increases						
HAWAII	01120	01	1.268	1.573	0.305	24.1 %
MIAMI, FL	00590	04	1.071	1.256	0.185	17.2
YUMA (CITY), AZ	01030	08	0.814	0.998	0.184	22.6
FLAGSTAFF (CITY), AZ	01030	05	0.814	0.986	0.172	21.1
PRESCOTT (CITY), AZ	01030	07	0.814	0.986	0.172	21.1
VIRGIN ISLANDS	00973	50	1.000	1.159	0.159	15.9
DALLAS, TX	00900	11	0.863	0.998	0.135	15.7
DENTON, TX	00900	12	0.863	0.998	0.135	15.7
DE KALB, IL	00621	03	0.830	0.962	0.132	15.9
D.C. + MD/VA SUBURBS	00580	01	1.374	1.495	0.121	8.8
SMALL E. CITIES, MO	11260	02	0.649	0.768	0.119	18.3
SEATTLE (KING CNTY), WA	00932	02	1.002	1.120	0.118	11.7
SOUTH + E. SHORE MD	00690	03	1.015	1.113	0.098	9.6
POUGHKPSIE/N.NYC SUBURBS	00803	03	1.104	1.193	0.089	8.1
NORTHERN NEW JERSEY	00860	01	1.339	1.421	0.082	6.1
RHODE ISLAND	00870	01	1.058	1.132	0.074	7.0
DELAWARE	00570	01	1.051	1.122	0.071	6.7
FORT WORTH, TX	00900	28	0.863	0.932	0.069	8.0
PHILLY/PITT MED SCHS/HOSPS	00865	01	0.985	1.050	0.065	6.6
W + SE WA (EXCL SEATTLE)	00932	01	0.939	1.002	0.063	6.7
VERMONT	00780	50	0.965	1.027	0.062	6.4
HOUSTON, TX	00900	18	0.796	0.857	0.061	7.7
WESTERN MARYLAND	00690	02	1.004	1.064	0.060	6.0
CLEVELAND, OH	16360	03	0.811	0.871	0.060	7.4
SOUTHERN MAINE	21200	03	1.080	1.139	0.059	5.5
MADISON, WI (DANE COUNTY)	00951	15	0.942	1.000	0.058	6.1
SM. TOWN/INDUSTRIAL VA	10490	03	0.763	0.821	0.058	7.6
SW CONNECTICUT	10230	02	1.397	1.454	0.057	4.1
SANTA BARBARA, CA	02050	16	1.247	1.301	0.054	4.3
Largest Decreases						
RENO, ET AL (CITIES), NV	01290	02	1.427	1.015	-0.412	-28.9
PHOENIX, AZ	01030	01	1.134	0.884	-0.250	-22.0
TUCSON (CITY), AZ	01030	02	1.084	0.858	-0.226	-20.8
NEW ORLEANS, LA	00528	01	1.011	0.791	-0.220	-21.7
ABILENE, TX	00900	29	0.849	0.639	-0.210	-24.7
SAN ANGELO, TX	00900	30	0.855	0.678	-0.177	-20.7
MASSACHUSETTS URBAN	00700	01	1.444	1.304	-0.140	-9.7
DETROIT, MI	00710	01	1.053	0.926	-0.127	12.0
OAKLAND-BERKELEY, CA	00542	07	1.580	1.457	-0.123	-7.8

TABLE 3-1

LOCALITIES EXPERIENCING LARGE CHANGES IN OFFICE RENTAL INDEX AS A RESULT OF USING 1993 FAIR MARKET RENTS (FMRs)[a]

Locality Name	Carrier	Locality	1987 FMR	1993 FMR	Change	Percent Change
UTAH	00910	09	0.917	0.798	-0.119	-13.0
OKLAHOMA	01370	00	0.799	0.684	-0.115	-14.4
SANTA CLARA, CA	00542	09	1.719	1.611	-0.108	-6.3
TEMPLE, TX	00900	06	0.773	0.676	-0.097	-12.6
ALASKA	01020	01	1.304	1.215	-0.089	-6.8
E.CEN+NE WA (EXCL SPOKANE)	00932	04	0.932	0.847	-0.085	-9.1
SPOKANE+RICHLND(CITIES)	00932	03	0.970	0.888	-0.082	-8.5
REST OF NEVADA	01290	99	1.221	1.144	-0.077	-6.3
SOUTHEAST IL	00621	13	0.751	0.675	-0.076	-10.1
ANAHEIM-SANTA ANA, CA	02050	26	1.618	1.546	-0.072	-4.4
PUERTO RICO	00973	20	0.787	0.716	-0.071	-9.0
ATLANTA, GA	01040	01	1.083	1.017	-0.066	-6.1
PORTLAND,ET AL (CITIES),OR	01380	01	1.002	0.936	-0.066	-6.6
QUINCY, IL	00621	07	0.751	0.687	-0.064	-8.5
SOUTHEAST (OHIO VALLEY) OH	16360	15	0.769	0.714	-0.055	-7.1
WESTERN RURAL TEXAS	00900	04	0.679	0.625	-0.054	-7.9
SOUTHERN IL	00621	14	0.751	0.699	-0.052	-6.9

[a]More than a 5 percentage point gain or loss.

expense GPCI in the first year of updating. Changes resulting from this blend are shown in Table 3-2. The number of localities with a large gain or loss is cut in half compared with a FY 1993 FMR update: 24 localities gain or lose more than 5 percentage points compared with 55. As expected, the largest gains or losses are also cut in half. Of course, with a two-year transition to a fully updated GPCI, these same changes would occur in the second transition year as well as the first.

3.3.2 Three Year Average: FY 1993, 1992, 1991 FMRs

One way to increase the stability of the office rental index is to employ a multi-year average. Table 3-3 shows large changes in locality rental indices as a result of updating with an average of FY 1993, 1992, and 1991 FMRs. As expected, large gains or loses are attenuated. As compared to a FY 1993 FMR update, Hawaii gains 15 percent instead of 24 percent, and Reno, Nevada loses 11 percent instead of 29 percent. The number of localities experiencing gains of more than 5 percentage points falls only from 29 to 22, and loses of more than 5 percentage points only from 26 to 23. Thus, the three year average attenuates large gains/losses more it than reduces the number of localities with moderate to large changes. Overall, the total (post-transition) changes from a three-year average update have some similarity to the first-year changes resulting from a FY 1993 FMR update.

3.3.3 County-Specific Rents in CMSAs

Our third option for updating the office rental index uses the FY 1993 FMRs and county-specific rents in CMSAs. The most useful comparison for this option is the FY 1993 FMR update without county-specific rents (option 1 for updating). Comparison to FY 1993 FMRs isolates the effects of using county-specific rents from the effects of updating with newer data. Differences between the FY 1993 FMR proxy and the 1993 FMRs with county-specific rents are displayed by Medicare payment locality in Table 3-4.

Few localities experience large changes in their office rental index as a result of differentiating rents by county within CMSAs. Only 7 rental indices change by more than 5 percentage points, with 5 gaining and 2 losing. By far the largest change is a 29 percent gain for the Manhattan, New York locality. No other locality's index changes by more than 10 percent. The Queens borough of New York City gains 8 percent, while the locality

TABLE 3-2

LOCALITIES EXPERIENCING LARGE CHANGES IN OFFICE RENTAL INDEX AS A RESULT OF USING A BLEND OF 1987 AND 1993 FAIR MARKET RENTS (FMRs)[a]

Locality Name	Carrier	Locality	1987 FMR	1987,1993 FMR	Change	Percent Change
Largest Increases						
HAWAII	01120	01	1.268	1.421	0.153	12.0 %
YUMA (CITY), AZ	01030	08	0.814	0.906	0.092	11.3
MIAMI, FL	00590	04	1.071	1.163	0.092	8.6
FLAGSTAFF (CITY), AZ	01030	05	0.814	0.900	0.086	10.6
PRESCOTT (CITY), AZ	01030	07	0.814	0.900	0.086	10.6
VIRGIN ISLANDS	00973	50	1.000	1.079	0.079	7.9
DALLAS, TX	00900	11	0.863	0.931	0.068	7.8
DENTON, TX	00900	12	0.863	0.931	0.068	7.8
DE KALB, IL	00621	03	0.830	0.896	0.066	8.0
D.C. + MD/VA SUBURBS	00580	01	1.374	1.434	0.060	4.4
SEATTLE (KING CNTY), WA	00932	02	1.002	1.061	0.059	5.9
SMALL E. CITIES, MO	11260	02	0.649	0.708	0.059	9.2
Largest Decreases						
RENO, ET AL (CITIES), NV	01290	02	1.427	1.221	-0.206	-14.4
PHOENIX, AZ	01030	01	1.134	1.009	-0.125	-11.0
TUCSON (CITY), AZ	01030	02	1.084	0.971	-0.113	-10.4
NEW ORLEANS, LA	00528	01	1.011	0.901	-0.110	-10.9
ABILENE, TX	00900	29	0.849	0.744	-0.105	-12.4
SAN ANGELO, TX	00900	30	0.855	0.767	-0.088	-10.3
MASSACHUSETTS URBAN	00700	01	1.444	1.374	-0.070	-4.9
DETROIT, MI	00710	01	1.053	0.990	-0.063	-6.0
OAKLAND-BERKELEY, CA	00542	07	1.580	1.519	-0.061	-3.9
UTAH	00910	09	0.917	0.857	-0.060	-6.5
OKLAHOMA	01370	00	0.799	0.742	-0.057	-7.2
SANTA CLARA, CA	00542	09	1.719	1.665	-0.054	-3.1

[a]More than a 5 percentage point gain or loss.

TABLE 3-3

LOCALITIES EXPERIENCING LARGE CHANGES IN OFFICE RENTAL INDEX AS A RESULT OF USING A BLEND OF 1991, 1992, AND 1993 FAIR MARKET RENTS (FMRs) (a)

Locality Name	Carrier	Locality	1987 FMR	'91,'92,'93 FMR	Change	Percent Change
Largest Increases						
HAWAII	01120	01	1.268	1.455	0.187	14.8 %
YUMA (CITY), AZ	01030	08	0.814	0.997	0.183	22.5
FLAGSTAFF (CITY), AZ	01030	05	0.814	0.982	0.168	20.7
PRESCOTT (CITY), AZ	01030	07	0.814	0.982	0.168	20.7
VIRGIN ISLANDS	00973	50	1.000	1.152	0.152	15.2
DE KALB, IL	00621	03	0.830	0.966	0.136	16.4
SEATTLE (KING CNTY), WA	00932	02	1.002	1.134	0.132	13.2
SMALL E. CITIES, MO	11260	02	0.649	0.778	0.129	19.9
DALLAS, TX	00900	11	0.863	0.989	0.126	14.6
DENTON, TX	00900	12	0.863	0.989	0.126	14.6
POUGHKPSIE/N.NYC SUBURBS	00803	03	1.104	1.184	0.080	7.3
D.C. + MD/VA SUBURBS	00580	01	1.374	1.452	0.078	5.7
RHODE ISLAND	00870	01	1.058	1.134	0.076	7.2
SOUTH + E. SHORE MD	00690	03	1.015	1.085	0.070	6.9
NORTHERN NEW JERSEY	00860	01	1.339	1.408	0.069	5.2
MIAMI, FL	00590	04	1.071	1.139	0.068	6.4
VERMONT	00780	50	0.965	1.032	0.067	6.9
SOUTHERN MAINE	21200	03	1.080	1.143	0.063	5.8
PHILLY/PITT MED SCHS/HOSPS	00865	01	0.985	1.043	0.058	5.9
DELAWARE	00570	01	1.051	1.106	0.055	5.2
SM. TOWN/INDUSTRIAL VA	10490	03	0.763	0.817	0.054	7.1
SANTA BARBARA, CA	02050	16	1.247	1.298	0.051	4.1
Largest Decreases						
RENO, ET AL (CITIES), NV	01290	02	1.427	1.271	-0.156	-11.0
PHOENIX, AZ	01030	01	1.134	0.981	-0.153	-13.5
OAKLAND-BERKELEY, CA	00542	07	1.580	1.441	-0.139	-8.8
SANTA CLARA, CA	00542	09	1.719	1.593	-0.126	-7.3
NEW ORLEANS, LA	00528	01	1.011	0.891	-0.120	-11.9
DETROIT, MI	00710	01	1.053	0.938	-0.115	-10.9
UTAH	00910	09	0.917	0.804	-0.113	-12.3
SPOKANE+RICHLND(CITIES)	00932	03	0.970	0.863	-0.107	-11.0
ALASKA	01020	01	1.304	1.197	-0.107	-8.2
E.CEN+NE WA (EXCL SPOKANE)	00932	04	0.932	0.830	-0.102	-10.9
ABILENE, TX	00900	29	0.849	0.755	-0.094	-11.1
TUCSON (CITY), AZ	01030	02	1.084	0.992	-0.092	-8.5
SAN ANGELO, TX	00900	30	0.855	0.771	-0.084	-9.8
OKLAHOMA	01370	00	0.799	0.718	-0.081	-10.1
SOUTHEAST IL	00621	13	0.751	0.681	-0.070	-9.3
QUINCY, IL	00621	07	0.751	0.693	-0.058	-7.7

TABLE 3-3

LOCALITIES EXPERIENCING LARGE CHANGES IN OFFICE RENTAL INDEX AS A RESULT OF USING A BLEND OF 1991, 1992, AND 1993 FAIR MARKET RENTS (FMRs) (a)

Locality Name	Carrier	Locality	1987 FMR	'91,'92,'93 FMR	Change	Percent Change
TEMPLE, TX	00900	06	0.773	0.718	-0.055	-7.1
COLORADO	00550	01	0.981	0.927	-0.054	-5.5
N. K.C. (CLAY/PLATTE), MO	00740	02	0.885	0.834	-0.051	-5.7
K.C. (JACKSON COUNTY), MO	00740	03	0.885	0.834	-0.051	-5.7
SUBURBAN KANSAS CITY, KS	00740	04	0.885	0.834	-0.051	-5.7
KANSAS CITY, KS	00740	05	0.885	0.834	-0.051	-5.7
SOUTHEAST (OHIO VALLEY) OH	16360	15	0.769	0.718	-0.051	-6.6

(a) More than a 5 percentage point gain or loss.

TABLE 3-4

LOCALITIES EXPERIENCING LARGE CHANGES IN OFFICE RENTAL INDEX AS A RESULT OF USING COUNTY-SPECIFIC RENTS, 1993[1]

Locality Name	Carrier	Locality	1993 FMR[2]	1993 County-Specific FMR[2]	Change	Percent Change
Largest Increases						
MANHATTAN, NY	00803	01	1.628	2.102	0.475	29.2 %
SUBURBAN CHICAGO, IL	00621	15	1.243	1.337	0.094	7.6
QUEENS, NY	14330	14	1.628	1.705	0.077	4.7
MILWAUKEE SUBURBS, WI (SE)	00951	46	0.897	0.952	0.055	6.2
EASTERN CONN.	10230	04	1.156	1.207	0.051	4.4
Largest Decreases						
NYC SUBURBS/LONG I., NY	00803	02	1.615	1.476	-0.138	-8.6
PHILLY/PITT MED SHCS/HOSPS	00865	01	1.050	0.965	-0.085	-8.1

[1]More than a 5 percentage point gain or loss.
[2]NYC FMR replaced by Bergen-Passaic FMR.

comprised of the other boroughs of New York City, Long Island, and the northern New York City suburbs loses 9 percent.

3.3.4 Two Bedroom Versus Four Bedroom FMRs

Table 3-5 shows localities with the largest differences between GPCI rental indices computed from the 2 and 4 bedroom FY 94 FMRs (published by HUD in the October 1, 1993 Federal Register). The differences are non-trivial, but not large. The two indices differ by less than 10 percent in all areas. Since the rental index comprises about 10 percent of the overall Geographic Adjustment Factor (GAF), the effect of this choice on the GAF is less than one percent everywhere. There is no readily discernible pattern to the differences.

TABLE 3-5

LOCALITIES WITH THE LARGEST DIFFERENCES BETWEEN OFFICE RENTAL INDICES BASED ON TWO- AND FOUR-BEDROOM FAIR MARKET RENTS (FMRs)

Locality Name	Carrier	Locality	1994 2 Bedroom FMR	1994 4 Bedroom FMR	Difference	Percent Difference
Largest Increases						
MANHATTAN, NY	00803	01	1.842	1.722	0.120	7.0 %
QUEENS, NY	14330	04	1.494	1.396	0.098	7.0
SAN DIEGO/IMPERIAL, CA	02050	28	1.253	1.172	0.081	6.9
SUBURBAN CHICAGO, IL	00621	15	1.291	1.212	0.078	6.5
VIRGIN ISLANDS	00973	50	1.096	1.023	0.073	7.1
CHICAGO, IL	00621	16	1.172	1.100	0.071	6.5
BAKERSFIELD, CA	00542	14	1.077	1.007	0.070	6.9
DENTON, TX	00900	12	1.015	0.946	0.068	7.2
ALASKA	01020	01	1.221	1.153	0.068	5.9
DALLAS, TX	00900	11	0.999	0.931	0.067	7.2
ROCHESTER/SURR. CNTYS, NY	00801	02	0.993	0.927	0.066	7.1
FRESNO/MADERA, CA	00542	11	0.985	0.920	0.065	7.0
ROCKFORD, IL	00621	02	1.022	0.957	0.065	6.8
URBAN MASS	00700	01	1.333	1.269	0.065	5.1
VICTORIA, TX	00900	32	1.033	0.969	0.065	6.7
MILWAUKEE SUBURBS (SE), WI	00951	46	0.992	0.927	0.065	7.0
ODESSA, TX	00900	13	0.958	0.896	0.063	7.0
MIDLAND, TX	00900	23	0.958	0.896	0.063	7.0
DETROIT, MI	00710	01	1.003	0.941	0.062	6.6
AUSTIN, TX	00900	31	0.938	0.876	0.062	7.1
MILWAUKEE, WI	00951	04	0.913	0.851	0.061	7.2
PEORIA, IL	00621	05	0.940	0.879	0.060	6.9
YUMA, AZ	01030	08	0.922	0.863	0.059	6.8
SAN FRANCISCO, CA	00542	05	1.760	1.704	0.057	3.3
MASS SUBURBS/RURAL CITIES	00700	02	1.209	1.152	0.057	4.9
N. CENTRAL CITIES, NY	00801	03	0.925	0.868	0.057	6.6
BATON ROUGE, LA	00528	03	0.878	0.822	0.056	6.8
SAN MATEO, CA	00542	06	1.742	1.686	0.056	3.3
METROPOLITAN, IN	00630	01	0.850	0.794	0.056	7.1
TUSCON, AZ	01030	02	0.854	0.798	0.056	7.0
MERCED/SURR. CNTYS, CA	00542	10	1.003	0.948	0.055	5.8
LAFAYETTE, LA	00528	06	0.836	0.782	0.054	6.9
DES MOINES (POLK/WARREN), IA	00640	05	0.887	0.833	0.054	6.5
SAN ANTONIO, TX	00900	07	0.824	0.770	0.054	7.1
LONGVIEW, TX	00900	17	0.836	0.783	0.054	6.9
CORPUS CHRISTI, TX	00900	24	0.870	0.815	0.054	6.7
ROCK ISLAND, IL	00621	04	0.837	0.784	0.053	6.7
SOUTHERN MAINE	21200	03	1.122	1.070	0.053	4.9

TABLE 3-5

LOCALITIES WITH THE LARGEST DIFFERENCES BETWEEN OFFICE RENTAL INDICES BASED ON TWO- AND FOUR-BEDROOM FAIR MARKET RENTS (FMRs)

Locality Name	Carrier	Locality	1994 2 Bedroom FMR	1994 4 Bedroom FMR	Difference	Percent Difference
WACO, TX	00900	22	0.784	0.733	0.052	7.0
BUFFALO/SURR. CNTYS, NY	00801	01	0.837	0.786	0.051	6.5
MINNESOTA (TRAVELERS)	00720	00	0.933	0.883	0.050	5.7
LAREDO TX	00900	33	0.775	0.726	0.050	6.9
LARGEST DECREASES						
DC +MD/VA SUBURBS	00580	01	1.529	1.675	-0.146	-8.7
OAKLAND/BERKLEY, CA	00542	07	1.420	1.555	-0.135	-8.7
LOS ANGELES (1ST OF 8)	02050	18	1.506	1.618	-0.112	-6.9
LOS ANGELES (2ND OF 8)	02050	19	1.506	1.618	-0.112	-6.9
LOS ANGELES (3RD OF 8)	02050	20	1.506	1.618	-0.112	-6.9
LOS ANGELES (4TH OF 8)	02050	21	1.506	1.618	-0.112	-6.9
LOS ANGELES (5TH OF 8)	02050	22	1.506	1.618	-0.112	-6.9
LOS ANGELES (6TH OF 8)	02050	23	1.506	1.618	-0.112	-6.9
LOS ANGELES (7TH OF 8)	02050	24	1.506	1.618	-0.112	-6.9
LOS ANGELES (8TH OF 8)	02050	25	1.506	1.618	-0.112	-6.9
SEATTLE (KING CNTY), WA	01390	02	1.157	1.268	-0.111	-8.7
LAS VEGAS, ET AL. (CITIES), NV	01290	01	1.077	1.179	-0.102	-8.7
SACRAMENTO/SURR. CNTYS, CA	00542	04	1.087	1.188	-0.101	-8.5
MADISON (DANE COUNTY), WI	00951	15	1.032	1.129	-0.098	-8.6
TIDEWATER & N VA CNTYS	10490	02	1.060	1.157	-0.097	-8.4
HOUSTON, TX	00900	18	0.970	1.062	-0.092	-8.6
BRAZORIA, TX	00900	09	0.964	1.055	-0.091	-8.6
FORT WORTH, TX	00900	28	0.930	1.019	-0.089	-8.7
GALVESTON, TX	00900	15	0.903	0.987	-0.085	-8.6
N. COASTAL CNTYS, CA	00542	01	1.220	1.304	-0.084	-6.5
PHOENIX, AZ	01030	01	0.892	0.976	-0.084	-8.6
MIAMI, FL	00590	04	1.286	1.368	-0.082	-6.0
NEW ORLEANS, LA	00528	01	0.802	0.879	-0.078	-8.8
EL PASO, TX	00900	14	0.810	0.887	-0.077	-8.7
ATLANTA, GA	01040	01	1.021	1.098	-0.076	-7.0
RICHMOND & CHARLOTTESVILLE, VA	10490	01	0.932	1.007	-0.075	-7.5
FORT LAUDERDALE, FL	00590	03	1.167	1.241	-0.074	-5.9
MIDDLE. NJ	00860	02	1.442	1.515	-0.074	-4.9
FLAGSTAFF, AZ	01030	05	0.972	1.046	-0.073	-7.0
REST OF NEVADA	01290	99	1.046	1.116	-0.070	-6.2
SHREVEPORT, LA	00528	02	0.730	0.799	-0.069	-8.6
STOCKTON/SURR. CNTYS, CA	00542	08	1.005	1.074	-0.069	-6.4
LAKE CHARLES, LA	00528	04	0.732	0.800	-0.068	-8.5

TABLE 3-5

LOCALITIES WITH THE LARGEST DIFFERENCES BETWEEN OFFICE RENTAL INDICES BASED ON TWO- AND FOUR-BEDROOM FAIR MARKET RENTS (FMRs)

Locality Name	Carrier	Locality	1994 2 Bedroom FMR	1994 4 Bedroom FMR	Difference	Percent Difference
AMARILLO, TX	00900	26	0.702	0.770	-0.068	-8.8
COLORADO	00550	01	0.909	0.975	-0.066	-6.7
WICHITA FALLS, TX	00900	34	0.690	0.756	-0.066	-8.7
ABILENE, TX	00900	29	0.674	0.737	-0.063	-8.5
EUGENE, ET AL. (CITIES), OR	01380	02	0.897	0.957	-0.060	-6.2
ELKO & ELY (CITIES), NV	01290	03	0.989	1.049	-0.059	-5.7
MARIN/NAPA/SOLANO, CA	00542	03	1.399	1.457	-0.058	-4.0
KINGS/TULARE, CA	00542	13	0.834	0.892	-0.058	-6.5
VENTURA, CA	02050	17	1.584	1.639	-0.055	-3.3
ANAHEIM/SANTA ANA, CA	02050	26	1.537	1.590	-0.053	-3.3

4.0 NEW YORK CITY AREA OFFICE RENTAL INDICES

The office rental index for New York City is problematic. New York City rent control ordinances may lower residential apartment rents below free market levels (see Chapter 2), but rent control does not apply to commercial office space. Thus, the New York City FMR may not be a good indication of relative physician office rents in New York City. Because of this problem, the New York City FMR was replaced by the FMR of Bergen-Passaic, New Jersey in computation of the current Medicare Fee Schedule office rental index. The Bergen-Passaic FMR was chosen because it was the highest in the New York City area CMSA, and spatial economic theory suggests that rents in the urban core will be at least as high as elsewhere in the metropolitan area.

An additional limitation of the current New York City office rental index is that it is the same for all counties in the New York City PMSA. In reality, rents may vary significantly within New York City. Manhattan physicians have claimed that their office rents are substantially higher than in other boroughs. If New York were a single Medicare payment locality, an average city-wide rent would suffice to establish an accurate office rental index. But because Manhattan and Queens are distinct Medicare payment localities, measuring rental variation by borough is necessary to create appropriate rental indices for the New York City localities.

Thus, two significant issues surrounding the New York City office rental indices must be resolved:

(1) What is the appropriate office rental index for New York City, on average?

(2) Do rents vary by borough within New York City? If so, how can they be reflected in the office rental index?

This chapter considers both of these issues. First, in Section 4.1, we evaluate evidence from surveys of physician practices on office expense per square foot in the New York City area. Then, in Section 4.2, we discuss evidence on apartment rents in the New York City PMSA. Section 4.3 shows the impact of incorporating county-specific rents and alternative average New York City rental values on rental indices for New York City area Medicare payment localities.

4.1 Evidence From Physician Surveys

Two surveys of physician practices collect information on physician office expenses per square foot: the Health Care Financing Administration's Physician Practice Costs and Income Survey (PPCIS) and the American Medical Association's (AMA) Socioeconomic Monitoring Survey (SMS). PPCIS rents include utilities and telephone in addition to annual tax deductible rental, lease, or depreciation/interest costs for space. (The PPCIS rental data are analyzed in greater detail in Chapter 5.) The SMS requests "office expenses," including annual rent, lease, or mortgage expenses. We were able to identify PPCIS physicians by county, but SMS physicians only by Medicare locality. We put office expenses from each survey on a square foot basis, then calculated median expense per square foot nationally and for New York City area counties or payment localities. The New York medians were standardized by the national median cost per square foot to create an index analogous to the GPCI office rental index. PPCIS rents are for 1988, and SMS rents are for 1991 or 1990.

Table 4-1 shows PPCIS rental indexes for the New York City area, together with the number of physician practices on which they are based (N). Approximate 90 percent confidence intervals for the indexes were calculated using a nonparametric statistical procedure (DeGroot, 1975, p. 472). The PPCIS office expense index for the New York PMSA is 1.38, which is less than its value of 1.578 in the current (FY 1987 FMR) GPCI office rental index or its value of 1.628 if Bergen-Passaic's fiscal year 1993 FMR is substituted for the New York FMR. However, the confidence interval for the index value is rather large because it is based on only 68 practices. There is a 90 percent chance that New York's "true" index value is between 1.22 and 1.63. This range includes the office rental indices implied by the Bergen-Passaic substitution, so they cannot be statistically rejected. However, the Bergen-Passaic substitution does put the New York index at the upper limit of the 90 percent confidence interval.

We also computed index values for Manhattan and for the other four New York City boroughs combined (Queens, Bronx, Brooklyn, and Staten Island). Both these indexes are estimated quite imprecisely from a small number of practices, as is shown by their enormous confidence intervals. Nevertheless, by a formal statistical test, Manhattan's office rent is statistically greater than that of the other four boroughs at the 90 percent level of confidence. The estimated index for Manhattan is 2.23 compared to 1.04 for the other boroughs. Not much weight should be put on these particular index values because of the considerable imprecision with which they are estimated.

TABLE 4-1

NEW YORK CITY AREA MEDIAN PHYSICIAN OFFICE COST PER SQUARE FOOT:
PHYSICIAN PRACTICE COST AND INCOME SURVEY, 1988
(indexed to national median cost per square foot = 1.0)

Area	Index	Confidence Interval	Significance Level[a]	N
NYC PMSA	1.38	1.22, 1.63	89 %	68
NYC	1.40	1.13, 1.63	89	57
Manhattan	2.23	1.40, 2.68	91	22
Other Boroughs	1.04	0.88, 1.59	90	35

[a]Of confidence interval.

NOTE: Includes utilities and telephone in addition to rent.

SOURCE: 1988 Physician Practice Cost and Income Survey.

The PPCIS data thus indicate that: (1) the Bergen-Passaic FMR provides an office rental index for New York City that is in the acceptable range, but is at the upper limit of that range; (2) Manhattan rents are greater than those in the other four boroughs. Table 4-2 shows office expense indexes from the 1991 and 1990 AMA surveys by Medicare payment locality. (We did not calculate confidence intervals for the AMA indexes, but they are probably similar to the PPCIS intervals for a similar number of observations.) The AMA indexes are consistent with the PPCIS indexes. They indicate that a reasonable office rental index for the New York City area is 1.5 to 1.6, and that Manhattan rents may be higher than those in other New York City area localities.

4.2 Apartment Rents by County in the New York Metropolitan Area

Apartment rents alone may not be able to establish appropriate office rental indices for the New York City area because rent control may cap them below market levels. However, relative apartment rents may be useful in determining relative office rental indices for counties within the New York City PSMA. HUD does not produce FMRs for individual metropolitan counties. To measure county-specific rents, we obtained a HUD special tabulation of 1990 Census data. We utilize the 45th percentile of the rental distribution of two-bedroom apartments rented by recent movers to be consistent with the FMRs.

These rents are shown for all counties in the New York City PMSA in Table 4-3. Westchester county, New York is excluded because HUD produces a distinct FMR for Westchester county. The Census rents show a large variation among counties. Manhattan is the highest, at $931 per month, followed by Putnam and Rockland counties. Rents in the Bronx and Brooklyn, at $537 and $635, respectively, are much lower. These differences are based on sample sizes of thousands of apartments and are highly statistically significant. The Census apartment rents, then, provide strong evidence of rental variation among New York City counties.

4.3 Office Rental Indices for New York City Area Localities

The evidence from surveys of physician practice costs and from the Census apartment rents indicates significant variation in rents among counties in the New York City PMSA. This variation in physician costs should be reflected in the GPCI office rental index. Because the Census apartment rents are consistent with the HUD FMRs, which are the basis of the

TABLE 4-2

NEW YORK CITY AREA MEDIAN PHYSICIAN OFFICE EXPENSES PER SQUARE FOOT: AMA DATA, 1991, 1990
(indexed to national median cost per square foot = 1.0)

	1991		1990	
Locality	**Index**	**N**	**Index**	**N**
All "NYC" localities[a]	1.51	76	1.60	39
Manhattan	1.61	21	2.93	14
Queens, other boroughs,suburbs, Long Island	1.50	55	1.52	25

[a]Manhattan, Queens, other boroughs, suburbs, Long Island.

Source: American Medical Association Socioeconomic Monitoring Survey.

TABLE 4-3

COUNTY-SPECIFIC APARTMENT RENTS FOR THE NEW YORK CITY PMSA[1]

County	45th Percentile Rent[2]
Manhattan	$931
Queens	$755
Staten Island	$715
Brooklyn	$635
Bronx	$537
Putnam	$893
Rockland	$837

[1]Excludes Westchester county, for which HUD calculates a separate fair market rent (FMR).

[2]Gross monthly rent, 2-bedroom apartments, recent movers, from HUD special tabulation of the 1990 Census.

SOURCE: HUD Special Tabulation of 1990 Census data.

office rental index, they can be used to define relative county-specific rents for the office rental index.

In Table 4-4, we present options for updated office rental indices for New York City area Medicare payment localities.[1] All the options reflect the adjustment of HUD's FMR by county-specific rents for each New York City borough (and for all other counties in the New York CMSA) from a special tabulation of 1990 Census rental data. The six options for updating are:

1. Use the actual FY 94 FMR for New York City.
2. Increase New York City's FMR by 10 percent to offset the effects of residential rent control in New York City. The 10 percent adjustment is derived from a study of the amount by which rent control lowers New York City rents cited in HUD's publication Report to Congress on Rent Control, September 1991.
3. Replace New York City's FMR with the FMR of Bergen-Passaic, New Jersey. This is an update of what is currently being done.
4. Replace New York City's FMR with the FMR of Westchester county, New York. Even though Westchester county is in the same primary MSA as New York City, HUD is required by Congress to establish a separate FMR for Westchester county.
5. Replace New York City's FMR with the average of the New York City area CMSA, excluding New York City itself.
6. Replace New York City's FMR with the average of the New York City area CMSA, including New York City.

Table 4-4 shows the current rental index and the six updating options for New York City area Medicare payment localities. The locality labelled "NYC suburbs/Long I., NY" includes the New York City boroughs of Brooklyn, the Bronx, and Staten Island, in addition to Nassau and Suffolk counties on Long Island, and Westchester and Rockland counties north of New York City. The rental indices of nearby localities and of selected other high-rent localities across the country are also shown for comparison. The comparison values are not repeated for each New York City option, since they change only slightly.

Compared to its current (1992) rental index, Manhattan's rental index rises under the first updating option, using the actual New York City FMR. Conversely, the rental indices of Queens and "NYC Suburbs" fall. This is due to the adjustment of HUD's New York City FMR by county-specific rents within the New York City metropolitan area. Manhattan rents are much higher than rents in the other New York City boroughs. Under the actual FMR

---

[1]The indices shown in Table 4-4 are based on the preliminary version of the final FY 1994 FMRs published in the October 1, 1993 Federal Register. The final office rental index used for payment is based on the final FY 1994 FMRs published by HUD in the April 6, 1994 Federal Register.

TABLE 4-4

OPTIONS FOR UPDATED NEW YORK CITY AREA OFFICE RENTAL INDICES

				UPDATED RENTAL INDICES					
	Carrier	Locality	Current Rental Index	Actual FMR	Increase NYC by 10%	Replace NYC W/ Bergen Passaic	Replace NYC w/ Westchester	Replace NYC w/ CMSA Avg., Excluding NYC	Replace NYC w/ CMSA Avg., Incl. NYC
NYC-AREA LOCALITIES									
MANHATTAN, NY	00803	01	1.578	1.842	2.018	2.020	2.177	1.981	1.922
QUEENS, NY	14330	04	1.578	1.494	1.630	1.638	1.765	1.607	1.558
NYC SUBURBS/LONG I., NY	00803	02	1.565	1.468	1.528	1.529	1.584	1.516	1.495
POUGHKPSIE/N NYC SUBURBS, NY	00803	03	1.104	1.288	1.296	1.296	1.304	1.294	1.292
NEARBY LOCALITIES									
NORTHERN NJ	00860	01	1.339	1.468					
MIDDLE NJ	00860	02	1.248	1.442					
SW CT	10230	02	1.397	1.680					
OTHER HIGH-RENT LOCALITIES									
HAWAII	01120	01	1.268	1.773					
SAN FRANCICSO, CA	00542	05	1.730	1.760					
SAN MATEO, CA	00542	06	1.730	1.742					
DC+ MD/VA SUBURBS	00580	01	1.374	1.529					
LOS ANGELES	02050	18-25	1.449	1.506					
URBAN MASS	00700	01	1.444	1.333					
SUBURBAN CHICAGO, IL	00621	15	1.219	1.291					
CHICAGO, IL	00621	16	1.193	1.172					

option, Manhattan's rental index is the highest in the country, slightly exceeding the rental indexes of Hawaii and San Francisco. The rental indices of Queens and "NYC Suburbs" are about equal to those of Northern and Middle New Jersey, but less than Southwest Connecticut.

The various options that adjust or replace the actual FMR raise the rental indices of Manhattan and Queens by 4 percent (replace NYC with CMSA average including NYC) to 18 percent (replace NYC with Westchester). The "NYC Suburbs" rental index is increased by a smaller percentage in these options. Three of the options -- increase NYC by 10 percent, replace NYC with Bergen-Passaic, and replace NYC with CMSA average excluding NYC -- result in very similar index values. Each of these options would raise the overall Geographic Adjustment Factor (GAF) of Manhattan and Queens by about 1 percent compared to use of the actual FMR, because the rental index accounts for about 10 percent of the overall GAF.

5.0 VALIDATION OF OFFICE RENTAL INDEX USING PHYSICIAN SURVEY DATA

The office rental index cannot currently be based upon actual physician expenditures for office space, since no survey exists providing data on this expense for a sufficiently large sample. However, survey data on physician expenditures can be used to examine the extent to which the index reflects variations in actual costs for office space incurred by physicians. Two previous studies comparing the GPCI index with input price data from the American Medical Association are discussed in section 5.1. Section 5.2 presents our results comparing the GPCI index with physician expenditure data from another source--HCFA's most recent Physicians' Practice Costs and Income Survey

5.1 Previous Validations

Studies by Gillis *et al.* (1992) and Zuckerman *et al.* (1992) have utilized data from the American Medical Association's Socioeconomic Monitoring System (SMS) survey to compare variation in office costs reflected by the GPCI with those reported by physicians. The SMS is a nationally representative survey of non-federal patient care physicians (excluding residents) stratified by specialty and census region.[1] Self-employed physicians are asked to report their share of practice expenses for six expense categories: professional liability premiums, nonphysician employee payroll, office expenses, medical equipment, medical supplies, and miscellaneous other expenses. Assuming that resources were divided equally among all owners of the practice, cost per square foot of office space can be calculated by dividing the reported cost for office expenses by the number of square feet of office space per physician owner in the practice. Using geographic identifiers provided by the AMA, the office rental index can be merged onto this file for each observation.

Both studies use data on office costs reported on the SMS for both 1990 and 1991. Gillis *et al.* rely solely on the GPCI values reported in the June 5, 1991 Federal Register which were constructed using HUD Fair Market Rent data for 1987. Thus, some discrepancies between reported physician prices and GPCI values may reflect changes in the relative costs of office space occurring during the late 1980's. Zuckerman *et al.* supplement analysis of the

[1]Gonzales (1992) provides a detailed discussion of the survey methodology.

1987 FMRs with more recent data from 1990 to determine whether this difference in survey year affects the results.

Gillis *et al.* and Zuckerman *et al.* both begin by testing whether there were significant geographic variations in the cost per square foot of office space reported by physicians. A finding of no geographic variations in cost would imply that the office rental component of physician expenses could be treated as a national market, and no GPCI adjustment would be necessary.

Specifically, they estimate the regression:

$$\ln (COST_{ij}) = \ln \alpha + \beta' X_{ij} + C_j D_j + E_{ij} \qquad (1)$$

where $COST_{ij}$ is the cost per square foot of office space reported by physician i practicing in locality j; X_{ij} is a vector of physician characteristics; and D_j is a dummy variable defined to be one if the physician practices in locality j and zero otherwise.

The joint F-test on the set of locality dummy coefficients provides a test of the null hypothesis that the input prices are identical across all localities. In both studies, this hypothesis is rejected at the 1 percent significance level, implying that input prices do vary across localities.

Second, each study tests whether the input price (cost per square foot) and the GPCI were correlated across areas by estimating the model:

$$\ln (COST_{ij}) = \ln \alpha + \beta' X_{ij} + \gamma \ln GPCI_j + E_{ij} \qquad (2)$$

where $COST_{ij}$ and X_{ij} are defined as above, and $\ln GPCI_j$ is the natural log of the GPCI for locality j. In this specification the coefficient measures the relationship between reported expenditures per square foot and the GPCI. A value of zero would indicate no relationship between the GPCI and the input price; a value of one would indicate the GPCIs and the input prices moved proportionately. In economic terminology, γ represents the elasticity of the SMS cost data with respect to the GPCI. An elasticity of one would imply, for example, that a 10% increase in input prices corresponded to a 10% increase in the GPCI. Gillis *et al.* estimate this regression using three specifications for the vector of physician characteristics: year dummies only; office type and year dummies; and specialty, office type and year dummies. They also estimate the model for a subsample consisting of only solo practitioners. The estimated coefficients on ln(GPCI) are relatively insensitive to model specification,

ranging from .70 to .77. These estimates were all significantly greater than zero, however. All were also significantly less than one. Zuckerman *et al.* estimate the regression using GPCI data calculated using Fair Market Rent data from three time periods and find coefficients ranging from .56 to .62. These results imply that while the GPCIs and SMS data are positively correlated, the SMS has significantly less variation across observations than does the GPCI.

Gillis *et al.* undertake two other tests for systematic variation in the GPCIs. First, they deflate the natural log of cost per square foot by natural log of the locality GPCI, and regress this ratio on a set of locality dummy variables. If the GPCI perfectly reflected variation in the input price the ratio between the two would equal one. If there were no systematic variation in the relationship between the GPCI and the price estimates, the coefficients on the locality dummy variables would not be significantly different from zero. The joint test that the GPCI-adjusted prices were the same across all localities was rejected.

To characterize areas that appear to be over- or under- compensated by the GPCI, the analysis of GPCI-adjusted input prices was repeated with the locality dummy variables replaced by a set of location dummy variables. These specify the county where the physician's practice was located as urban or rural, with separate classes for population categories. In this specification, the joint test for significance of the location dummies implies there is no systematic variation using this stratification.

5.2 Validation using the PPCIS

5.2.1 Data Description

The data source for this analysis is the 1988 Physicians' Practice Costs and Income Survey (PPCIS), sponsored by the Health Care Financing Administration. To be eligible for the survey, a physician was required to provide patient care services (excluding residents) and not be employed by a hospital, clinic, HMO or federal government agency.[2] These eligibility criteria are very similar to those used for the SMS. Data on practice expenses are for calendar year 1988.

The PPCIS contains 3,505 observations, similar to the size of the SMS. However, the 419 physician employees in the sample have been excluded from this analysis because they

[2]A detailed discussion of eligibility criteria and the survey can be found in Dayhoff etal. (1992).

were not asked financial questions about their practices. In addition, some physicians chose not to respond to the questions regarding office expenses. For this analysis, we do not utilize imputed data, leaving a sample of 2,265 observations.

The office expense section of the PPCIS contains a series of questions. Physicians were first asked whether they rented or owned their office space. Renters were asked to report their yearly rental or lease cost and owners to report their total yearly tax deductible depreciation and interest expenses. If this amount did not include utilities and telephone, physicians were asked to provide these expenses separately. By summing the responses to these three questions, we obtain the annual expenditures for office space; including utilities and telephone.

Physicians were asked to provide total costs for the group in which they practiced, unlike the SMS which asks for the physician's share of costs. Thus, cost per square foot of office space can be calculated by dividing the practice's total expenses for rent, taxes and depreciation, and utilities by the total square footage reported on the survey. This eliminates the need to assume that each physician owner shares equally in expenses, as must be done using the SMS data.

The PPCIS questions are quite detailed, attempting to prompt physicians to ensure that all relevant costs are provided, and verifying the initial response with physicians who reported no expenses for office space costs. However, these data are still not ideal for measuring physicians' true office space costs. First, all expense data on the PPCIS are self-reported; no audit is conducted to verify that amounts reported by respondents are accurate values. (This is also true of the SMS.) Second, while the PPCIS asks for details on the office arrangements of physicians reporting no office expenses, it obtains much less detail on physicians who do have expenses. For instance, the PPCIS identifies physicians with no office expenses because they received free space from a hospital; it does not, however, identify physicians who received subsidized space from a hospital.

5.2.2 Descriptive Results

Given a survey containing data for 2,265 physicians nationally, sample sizes for small geographic areas (i.e., counties, MSAs) are too limited to provide reliable estimates of office space costs. However, for broader geographic areas, data from the PPCIS can be meaningfully compared with GPCI rental indices computed from HUD data to verify the accuracy of using apartment rent data as a proxy for physician office space. PPCIS

observations were indexed by dividing the median for each geographic area by the sample median. For comparison, we use 1993 HUD fair market rents, with the value for New York City replaced by that for Bergen Passaic, indexed to a population-weighted national mean of 1.0.

Table 5-1 presents a comparison of PPCIS and GPCI index values by urbanicity, Census region, Census Division, and for selected cities with relatively large numbers of observations. The PPCIS indicates urbanicity of practice using three categories: rural, small MSA (under one million population) and large MSA (over one million population). The PPCIS and the GPCI yield very similar index values for both urban and rural locations. The largest difference between PPCIS and GPCI values is for small MSAs (1.01 compared to .92); for other stratifications the indexes differ by only a few percentage points.

The differences between PPCIS and GPCI indexes for the four Census regions are noticeably larger. The GPCI for the Northeast is about 15 percentage points higher than the PPCIS index; the GPCI for the West is about 7 percentage points higher than its PPCIS counterpart. Conversely, GPCIs for the Midwest and South are lower than the PPCIS indexes. Indexes by Census Division provide a similar pattern; GPCI values are greater than PPCIS values for the New England, Middle Atlantic, and Pacific Divisions.

The reasons for these differences in index values are not obvious. One possibility is that the relationship between rents for residential apartments and for physician office space are systematically different across regions. Under this interpretation, the GPCI values in the Northeast and West overstate the true costs of physician offices and those in the South and Midwest understate the true costs. However, this is not the only possible explanation for the differences. From conversations with real estate brokers (see Chapter 2) we know that physician offices typically require significant improvements (electrical, lighting, plumbing) that raise the cost of office space, relative to other commercial space. In Part III of this report, it is found using the PPCIS data that physicians in the Northeast have much lower expenses for medical supplies, medical equipment, and miscellaneous expenses (from 15 to 30 percent) than those practicing in other regions. Our analysis of the PPCIS indicates that physicians in the Northeast utilize smaller offices than do physicians in other regions. This suggests physicians in the Northeast may do fewer tests and procedures in their offices than those located in other regions. If this were the case they would require fewer such improvements, thereby reducing their costs. Thus, variations in expensiveness of construction, site-of-service (office/nonoffice), type of office space, practice style (and

TABLE 5-1

COMPARISON OF PHYSICIAN OFFICE EXPENSE PER SQUARE FOOT TO FAIR MARKET APARTMENT RENTS (Indexed to a National Average of 1.0)

	EXPENSE PER SQUARE FOOT		FAIR MARKET RENT
	N	Index[1]	Index[2]
URBANICITY			
Rural	544	0.75	0.74
Urban	1,721	1.07	1.08
Small MSA	1,066	1.01	0.92
Large MSA	655	1.19	1.19
REGION			
Northeast	447	1.07	1.22
Midwest	490	0.95	0.87
South	802	0.91	0.84
West	526	1.13	1.19
DIVISION			
New England	132	1.15	1.22
Middle Atlantic	314	1.05	1.26
East North Central	327	0.95	0.89
West North Central	163	0.97	0.81
South Atlantic	418	0.93	0.92
East South Central	143	0.81	0.70
West South Central	242	0.94	0.79
Mountain	136	0.98	0.91
Pacific	390	1.18	1.29
MSA			
Chicago	40	1.27	1.22
Los Angeles	77	1.33	1.45
Oakland	22	1.19	1.46
San Francisco	24	1.54	1.75

[1]Indexed to a national median of 1.0.
[2]indexed to a population-weighted national average of 1.0.

SOURCE: 1988 Physician's Practice Costs and Income Survey and FY 1993 HUD Fair Market Rents.

specialty) across regions could account for differences in actual expenditures per square foot relative to GPCI values.

The bottom panel of Table 5-1 presents PPCIS and GPCI values for four metropolitan areas. Sample sizes (N) indicate the problem with performing these type of comparisons for small geographic areas; even the most populous MSAs often have fewer than 40 practices providing data for office expenses on the PPCIS. Nevertheless, it is interesting to note the general correspondence between relative physician office expense per square foot and apartment rents, although the apartment rent index is higher in three of four cities.

5.2.3 Regression Results

To further explore the relationship between the GPCI and reported physician expenditures, we perform regression analysis with the PPCIS similar to that done previously by Gillis *et al.* and Zuckerman *et al.* using the SMS data. Following their methodology, we begin by regressing the natural log of cost per square foot from the GPCI on a series of locality dummy variables. The resulting F-statistic on the set of dummy variables tests the hypothesis that there is no significant variation in the input price by locality. As expected, this hypothesis is rejected; the F-statistic of 2.04 implies less than one in one thousand chance that the costs do not vary by locality.

To estimate the correlation between the PPCIS cost data and the GPCI values, we regress the natural log of cost per square foot on the natural log of the GPCI, as shown in equation 2. The proper specification for X, the vector of physician characteristics is unclear. It may be appropriate to include specialty dummy variables since office space requirements may vary systematically by specialty. However, as Gillis *et al.* note, the distribution of physicians by specialty differs systematically across areas, with primary care physicians being more prevalent in rural areas. Given differences in the GPCIs across rural and urban areas, it is possible that specialty dummies will pick up input price variation rather than control for differences in input characteristics. Thus, we performed regressions using alternative specifications with and without specialty dummy variables.

Our other control variable, OFFTYPE, reflects whether the physician rents or owns office space. The costs of physicians who own space may be more representative of previous market conditions (at the time of purchase) rather than current costs, given multi-year mortgages with fixed annual payments. Since we know little about the geographic

distribution of owners or the age of their mortgages, we include this dummy variable in some of our regression specifications.

The results of these regressions are presented in Table 5-2. Each of the alternative models utilizes the natural log of cost per square foot from the PPCIS as the dependent variable. Models 1, 3, and 5 use the natural log of a the office rental GPCI index merged onto the PPCIS by the county as an independent variable. The GPCI index is based on 1993 HUD FMRs. Models 2, 4, and 6 replaces the county level GPCI index with the GPCI index constructed for localities. Models 1 and 2 include both specialty and office type dummy variables; 3 and 4 contain office type dummy variables; 5 and 6 include ln(GPCI) as the only explanatory variable.

The coefficients on ln(GPCI) are very similar across all six specifications, ranging from 0.62 to 0.70. All are significantly greater than zero, implying that the GPCI rental index is correlated with office costs reported on the PPCIS. However, all the coefficients are significantly less than one, implying the relationship is less than proportional. That is, these estimates imply that a 10% increase in the GPCI corresponds to roughly a 7% increase in physician office expense per square foot. These elasticity estimates are very similar to those found by Gillis *et al.* and Zuckerman *et al.* in their work with the SMS.[3]

To investigate why these elasticities differ from one, we re-estimated model 5, using the county level GPCI, for several subsamples from the PPCIS. We began by estimating the model separately for the three office types: physicians who rent, physicians who own, and physicians who both rent and own. The coefficients from these regressions explain the elasticity between PPCIS and GPCI data within each particular subsample. For example, we had speculated that the coefficient from a regression including only physicians who own would be relatively low, since their costs reflect market conditions from the time the mortgage was signed, rather than current conditions.

The elasticity estimates from these regressions are presented in Table 5-3. As expected, the coefficient for physicians who rent (0.70) is greater than that for physicians who own office space (0.63). However, both are significantly lower than one. The estimate for physicians who both rent and own is much lower, however, relatively few physicians have this practice arrangement.

---

[3]The time lag between the 1993 HUM FMRs and the 1988 PPCIS appears to have little effect on the results. For comparison, we estimated the regressions using the GPCI constructed with 1987 HUD data, and the results were virtually identical.

TABLE 5-2

REGRESSIONS OF PPCIS COST PER SQUARE FOOT ON GPCI OFFICE RENTAL INDEX

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Price Proxy						
Log County Based GPCI	0.63		0.67		0.70	
	(12.01)		(13.11)		(13.23)	
Log Locality Based GPCI		0.62		0.67		0.70
		(11.00)		(12.00)		(12.07)
Office Type [a]						
Physician Rents	-0.19	-0.19	-0.19	-0.19		
	(3.22)	(3.16)	(3.25)	(3.17)		
Physician Owns	-0.74	-0.74	-0.77	-0.77		
	(10.56)	(10.52)	(10.95)	(10.93)		
Specialty [b]						
GP/FP	-0.31	-0.33				
	(3.36)	(3.62)				
Internal Medicine	-0.18	-0.19				
	(1.98)	(2.02)				
Cardiology	-0.25	-0.24				
	(2.29)	(2.20)				
Gastroenterology	-0.16	-0.15				
	(1.47)	(1.43)				
Other Medical	-0.16	-0.15				
	(1.64)	(1.67)				
General Surgery	-0.12	-0.13				
	(1.26)	(1.36)				
Orthopedic Surgery	-0.01	-0.19				
	(0.07)	(0.18)				
Ophthalmology	-0.67	-0.08				
	-(0.66)	(0.75)				
Urology	-0.10	-0.11				
	(1.02)	(1.10)				
Ob/Gyn	-0.14	-0.15				
	(1.44)	(1.55)				
Thoracic Surgery	0.03	0.03				
	(0.30)	(0.31)				
Other Surgery	-0.05	-0.05				
	(0.55)	(0.54)				
Psychiatry	-0.02	-0.02				
	(0.25)	(0.24)				
Anesthesiology	-0.29	-0.29				
	(2.46)	(2.48)				
Radiology	0.26	-0.24				
	(0.22)	(0.21)				
Intercept	3.07	3.07	2.95	2.94	2.69	2.69
R-Square	0.16	0.16	0.15	0.14	0.07	0.06

[a] Physician both rents and owns is the omitted category.

[b] Other specialties (primarily pathology and emergency medicine) is the omitted category.

NOTE: t-statistics are in parentheses.

SOURCE: 1988 Physician's Practice Costs and Income Survey and HUD Fair Market Rents.

gpci\pracexp\rent\TAB5-2.XLS

TABLE 5-3

ELASTICITY ESTIMATES FOR SUBGROUPS FROM REGRESSION OF PPCIS EXPENSE PER SQUARE FOOT ON GPCI INDEX OFFICE RENTAL

Subgroup	Elasticity Estimate	t-statistic	Standard Error
OFFICE TYPE			
Physician Rents	0.70	13.39	0.05
Physician Owns	0.63	3.27	0.19
Physician Both Rents & Owns	0.33	1.58	0.21
URBANICITY			
Rural	0.46	2.96	0.16
Small MSA	0.78	6.20	0.13
Large MSA	0.44	3.43	0.13
REGION			
Northeast	0.77	5.36	0.14
Midwest	1.11	5.69	0.19
South	0.70	6.96	0.10
West	0.61	4.97	0.12

Source: 1988 Physicians' Practice Costs and Income Survey and 1993 HUD Fair Market Rents.

Regressions run separately for three levels of urbanicity indicate that the GPCIs are more proportional with PPCIS data for small MSAs (less than one million population) than for rural areas or large MSAs. For small MSAs we cannot reject the hypothesis that the elasticity is equal to one; for other areas the estimate is clearly less than one.

Our final stratification provides estimates separately by Census region. Here we find that the estimates for the Northeast and Midwest are not statistically different from one. While the elasticities for the South and West are statistically greater than zero, they are also statistically less than one. The reasons for differing elasticities among these subsamples stratified by location are not clear. Sample sizes from the PPCIS prevent further stratifications--for example by urbanicity and region--that might help determine whether it is the region of the country, or the prevalence of each urbanicity type among regions that is driving these results.

The finding of elasticity estimates less than one using data from both the SMS and the PPCIS implies that physician expenditures per square foot of office space are less variable across areas than are HUD FMRs. One possible explanation for this result, the presence of physicians who own office space in physician surveys was tested using PPCIS data, and was found to have little effect. Two alternative explanations cannot be tested using our data. First, it is possible that physicians in high rent areas choose to locate in less-expensive types of offices, perhaps because they are more likely to do tests and procedures at non-office sites such as hospitals. (High rent areas tend to be large cities with a greater prevalence of non-office sites.) This would compress the distribution of physician expenditures per square foot relative to the distribution of apartment rents. Second, it is possible that random error in the FMRs' measurement of apartment rents is biasing the regression elasticity towards zero. Although the FMRs are generally accurate measures of apartment rents, for particular areas in particular years they may over- or under-state actual rents. The existence of random error in the FMRs is attested to by the sometimes large changes in FMRs that occur when area rents are resurveyed (see Chapter 3). In addition, the FMRs do not measure rental variations within metropolitan areas. With random error in the FMRs, even if the true relationship between apartment rents and physician office rents is proportional, the measured elasticity would be less than one.

5.2.4 Variation in Costs After Adjusting for the GPCI

Gillis *et al.* investigated whether systematic differences in input prices remain after adjusting the cost per square foot data from the SMS by the GPCI, and found evidence of significant variation in GPCI-adjusted prices across localities. We replicated this work using PPCIS data. The PPCIS cost per square foot was deflated by the GPCI, and the natural log of this ratio was regressed on a series of locality dummy variables. The joint F-test for significance on all the locality variables indicated that the hypothesis that GPCI-adjusted prices were the same could be rejected. (Table 5-1)

To characterize areas where the GPCI-adjusted prices appeared to be systematically high or low, we regressed the natural log of the GPCI-adjusted values on three dummy variables for varying levels of urbanicity--rural, small MSAs, and large MSAs. The middle panel of Table 5-4 reports the results of this regression. The joint F-test indicates that the adjusted prices do vary significantly across these three levels of urbanicity. The positive and significant coefficient for small MSAs implies that the GPCI-adjusted values for these areas are larger than those found for large MSAs (the omitted category). This is consistent with our descriptive findings reported in Table 5-1 in which the difference in median mean values between the PPCIS and GPCI was greater for small MSAs than for large MSAs or rural areas. The bottom panel presents results of a similar regression with dummy variables for region replacing the urbanicity variables. The GPCI adjusted costs do vary by region, with the South and Midwest significantly higher than the Northeast.

5.2.5 Conclusion

This analysis compares the HUD FMR data with actual physician expenditures per square foot of office space reported on the PPCIS. We find that the FMRs are positively correlated with office expenses. However, estimates of the elasticity of expenses per square foot with respect to the GPCI rental index are less than one--indicating that the GPCI exhibits greater variation across areas than does office expenses as reported on the PPCIS. These results are similar to those found in previous studies utilizing physician expenditure data from the SMS. However, these results do not necessarily indicate a fundamental problem with the use of HUD FMR data as a proxy for the price of physician office space. Differences in the type of office space (associated with geographic differences in site of service), random error in the FMRs, and geographic differences in the prevalence of subsidized space from

TABLE 5-4

TESTS FOR VARIATION IN GPCI ADJUSTED EXPENSE PER SQUARE FOOT

Log (COST/GPCI)	Joint F-statistic	R-square
Carrier-Localities	1.65	0.22
(significance level)	0.0001	

	Coefficient	t-statistic
Urbanicity Dummies		
Rural	-0.039	0.93
Small MSA	0.165	4.62

	Coefficient	t-statistic
Region Dummies		
Midwest	0.138	2.90
South	0.161	3.76
West	0.077	1.64

SOURCE: 1988 Physicians' Practice Costs and Income Survey and 1993 HUD Fair Market Rents.

hospitals are all factors that could help account for a non-proportional relationship between the GPCI index and physician office expenditures. We also find that variation remains in PPCIS cost per square foot data deflated by the GPCI. However, divergences between the GPCI and physician expenditure data do not indicate that the GPCI is systematically low in rural areas or high in urban areas. Instead, we find the greatest differences occur across regions--in particular, low office expenses in the Northeast relative to apartment rents. Previous analysis based on the PPCIS suggest that this stems from a practice style in the Northeast that is less office-based than found in other regions.

6.0 FINAL OFFICE RENTAL INDICES

After reviewing the earlier analyses in this report, the Health Care Financing Administration (HCFA) made the following decisions:

- the Fair Market Rents (FMRs) established by the Department of Housing and Urban Development (HUD) should continue to be used to define the GPCI office rental index;
- the GPCI office rental index should be based on 2-bedroom FMRs rather than 4-bedroom FMRs;
- the single most recent year of FMRs available should be used for the GPCI office rental index. For the 1996 GPCI update, the most recent available FMRs are the FY 1994 FMRs;
- county-specific rents (rather than metropolitan wide rents) should be reflected within large metropolitan areas (CMSAs), using the HUD special tabulation of 1990 Census apartment rents; and
- the actual New York City FMR should be used in the GPCI rental index.

In addition, HCFA decided that the GPCI should be weighted by relative value units or RVUs (practice expense RVUs in the case of the office rental index) rather than by population. Weighting by RVUs has two advantages. First, county RVUs identify the counties where Medicare services are provided more accurately than county population. The GPCI should be weighted to reflect input prices in the locations where services are performed. Second, weighting by RVUs assures that aggregate Medicare Fee Schedule payments for practice expense will not change if the payment locality configuration is altered (e.g., if a state with multiple localities becomes a single statewide locality). The differences between the RVU-weighted office rental index and the population-weighted office rental index are shown in Appendix II-2, where payment localities are ranked in descending order of the difference between the two indices.[1] The change in the office rental index from RVU-weighting ranges from a 8.1 percent increase in South Dakota to a 11.7 percent decline in the Rockford, Illinois locality. The changes in most localities are much smaller.

The 1996 updated office rent index differs from the 1992 office rent index in the following respects:

---

[1]The weight affects the computation of the wage index in two places. The first is in normalizing county rents by national average rents. For the final office rental index, the national average is weighted by practice expense RVUs rather than by population. This has the effect of scaling each payment locality's index up or down by the same proportion. The second effect occurs in taking a weighted average of county or county part values to form an index value for a payment locality. For the final office rental index, this average is weighted by practice expense RVUs rather than by population. This change affects each locality's index according to the difference in distribution among counties/county parts of RVUs versus population, and the difference among counties/county parts of rents.

- based on final FY 1994 FMRs rather than FY 1987 FMRs. The FY 1994 FMRs reflect a "benchmark" revision based on the 1990 Census, and also incorporate post-1990-Census rental survey data;
- based on 2-bedroom rather than 4-bedroom FMRs;
- reflects OMB's June 1993 redefinitions of metropolitan areas;[2]
- RVU-weighted rather than population-weighted;
- county-specific rents, rather than metropolitan area rents, are measured within large metropolitan areas (CMSAs); and
- New York City's actual FMR is used, rather than being replaced by the FMR of Bergen-Passaic New Jersey.

Of these changes, the use of the more recent FY 1994 FMRs has by far the largest overall effect on the office rental index.

After the original computation of the 1996 practice expense GPCI, HCFA actuaries determined that it would have to be rescaled to achieve "budget neutrality", that is, to ensure that aggregate payments to physicians are not affected by updating the GPCI. The practice expense GPCI was therefore multiplied by the factor 1.00125 and rounded to three decimal places. Since the practice expense GPCI is a linear combination of the employee wage and office rental indices (plus a constant representing the share of supplies, equipment, and miscellaneous in practice expenses), rescaling the practice expense GPCI in effect rescales the office rental index by the same factor. In Appendix II-3, we show the 1996 office rental index, the rescaled 1996 office rental index (the 1996 index multiplied by 1.00125), and the 1992 office rental index, by Medicare payment locality.

Appendix II-4 ranks Medicare payment localities by descending order of difference between the 1996 rescaled office rental index and the 1992 office rental index. The changes from updating are significant. Twenty of the 216 Medicare payment localities gain more than 10 percentage points and 55 lose more than 10 percentage points. The largest gainer is Hawaii, whose index rises 52 percentage points, or 41 percent. The largest loser is Victoria, Texas, which loses 38 percentage points. Nevertheless, it should be remembered that the office rental index accounts for only approximately 10 percent of the overall Medicare Fee Schedule Geographic Adjustment Factor (GAF). Hence, even the largest changes in the office rental index imply a gain or loss of less than 5 percent in the total Medicare fee.

[2]Although the office rental index is ultimately calculated for Medicare payment localities, the underlying rental data is tabulated by HUD for metropolitan areas and nonmetropolitan counties before it is crosswalked to localities.

REFERENCES

Building Owners and Managers Association International, 1992 BOMA Experience Exchange Report, Washington, DC, 1992.

College of Physicians & Surgeons of Columbia University, letter to Gail Wilensky at HCFA, September 20, 1991.

Dayhoff, D. and G. Pope, Validation of Medicare Fee Schedule Office Rental Proxy, Final Report, PPRC Contract No. T74276093/1, July 1990.

Dayhoff, D., et al., Handbook for Using the 1988 Physician's Practice Costs and Income Survey, Final Report, HCFA Cooperative Agreement No. 99-C-98526/1-08, April 1992.

DeGroot, M. H., Probability and Statistics. Reading, MA: Addison-Wesley Publishing Co., 1975.

Gillis, K, R. Reynolds, and R. Willke, "Assessing the Validity of the Geographic Practice Cost Indexes", Chicago: American Medical Association Center for Health Policy Research, September 1992.

Gonzalez, M., ed., Socioeconomic Characteristics of Medical Practice, 1992, Chicago: American Medical Association Center for Health Policy Research, 1992.

Institute of Real Estate Management, 1992 Office Buildings: Income/Expense Analysis, Chicago: IREM of the National Association of Realtors, 1992.

Medical Society of the State of New York, letter to Gail Wilensky at HCFA from Charles Aswad, MD, August 5, 1991.

Physician Payment Review Commission, Annual Report to Congress 1992, Washington, DC, 1992.

Schmitz, R. J., Estimating Physician Practice Costs in Manhattan, report to the College of Physicians & Surgeons of Columbia University, September 1991.

Society of Industrial and Office Realtors, 1992 Guide- Comparative Statistics of Industrial and Office Real Estate Markets, Washington, DC: SIOR and Landauer Real Estate Counselors, 1992.

U.S. Department of Housing and Uban Development, Report to Congress on Rent Control, Washington, DC: U.S. Government Printing Office, September 1991.

Urban Land Institute, Market Profiles 1992, Washington DC, 1992.

Welch, W. P., S. Zuckerman, and G. Pope, The Geographic Medicare Economic Index: Alternative Approaches, HCFA Grant No. 18-C-98326/1-01, June 1989.

Welch, W.P., S. Zuckerman, and G.C. Pope, Supplement to the Geographic Medicare Economic Index: Alternative Approaches, revised August, 1990. HCFA Grant No. 17-C-99222, 18-C-98526, and 17-C-98758. NTIS No. PB91-113506.

Zuckerman, S., M. Miller, M. Wade, and M. Pauly., Regional Variation in the Impact of Medicare Physician Payment Reform, Final Report, HCFA Contract No. 500-89-0054/3, November 1992, NTIS No. PB94-104056.

Zuckerman, S., P. Welch, and G. Pope, The Development of an Interim Geographic Medicare Economic Index, HCFA Grant No. 18-C-98326/1-01, December 1987.

PART III:

SUPPLIES, EQUIPMENT, AND MISCELLANEOUS PRICES

PART III: SUPPLIES, EQUIPMENT, AND MISCELLANEOUS PRICES

1.0 INTRODUCTION

The Geographic Practice Cost Index (GPCI) is used in Medicare's Fee Schedule for physician services to adjust payments for geographic variation in physicians' practice costs. Three components of the practice expense GPCI are medical supplies, medical equipment, and other (miscellaneous) expenses. Together they comprise approximately one-third of the practice expense GPCI. Currently, there is no adjustment for geographic variation in the prices of these three inputs. It has been assumed that physicians could purchase supplies, equipment, and miscellaneous inputs in "national markets" at the same price everywhere (Welch, Zuckerman, and Pope, 1989). However, no data has been located to verify this assumption.

1.1 Overview of Part III of the Report

Part III of this report reevaluates geographic variation in the prices of physician supplies, equipment, and miscellaneous inputs. Chapter 2 of Part III considers the availability of price data by area for these inputs, and also describes anecdotal/interview evidence on price variation. First, we review several previous searches for such data, and then describe the results of our additional efforts. Our conclusion is that price data are not currently available. Therefore, we then discuss issues in collection of primary data on input prices. In Chapter 3, we analyze geographic variation in expense and equipment purchase price data from HCFA's 1988 Physicians' Practice Cost and Income Survey. This analysis is contained in Section 3.2. In Section 3.1, we review two previous studies that analyzed geographic variation in AMA physician survey expense data and also discuss the limitations of inferring geographic variation in prices from geographic variation in expenditures. Chapter 4 provides conclusions and discusses the Health Care Financing Administration's decision not to make an adjustment for supplies, equipment, and miscellaneous prices in the updated (1996) practice expense GPCI.

2.0 INPUT PRICE DATA

The subject of this chapter is the nonlabor inputs physicians use, what is known about the prices of these inputs, and the how better price data by area might be obtained. This chapter thus focuses on medical supplies, medical equipment, and miscellaneous inputs. These three inputs comprise about one third of the practice expense GPCI.

Medical supplies consist of a wide range of items consumed in physician offices. Among the major subcategories of medical supplies are pharmaceuticals, dressings, catheters, syringes, tubes, and X-ray film. Within the pharmaceutical category alone, there are literally hundreds, if not thousands, of drugs and other ethical preparations used in performing physician services. IMS America, a major marketing research firm, classifies non-pharmaceutical medical supplies into 38 major categories. Each of these major categories usually consists of several sub-categories of products. As with pharmaceuticals, there are hundreds, if not thousands, of medical supplies.

There is also a wide variety of medical equipment used by physicians in their offices. Prominent among them are diagnostic equipment (e.g., X-ray machines and ultrasound machines) and laboratory equipment such as clinical chemistry analysis machines. Unlike medical supplies, which tend to be used just once, medical equipment has a physical economic lifespan of several years. Equipment such as CT-scanners that used to be associated only with hospitals is now starting to appear in physician offices. While the variety of medical equipment is high, it is not as great as medical supplies.

The miscellaneous category is quite heterogeneous. Professional automobile, continuing education, legal services, accounting services, office management services, professional association memberships, journals, telephone services, and office furniture are among the items that constitute this category. The most recent survey of physician practice expenses conducted by *Medical Economics* (1992) indicates that professional automobile expenses comprise 1.4 percent of total practice receipts and 3.9 percent of non-physician expenses while continuing education comprises 0.9 percent of total practice receipts and 2.7 percent of non-physician expenses.

2.1 Secondary Data

In this section we review the findings of previous studies that tried to obtain secondary input price data and then present the findings of our new search efforts.

2.1.1 Review of Previous Searches for Secondary Data

Urban Institute Report to HCFA

As part of a study on regional variation in the impact of recent Medicare physician payment changes, the Urban Institute (1992) assessed the practice expense GPCI. The Urban Institute tried to ascertain the degree of geographic input price variation in medical equipment by contacting trade associations and manufacturers of medical equipment. The National Association of Medical Equipment (NAME), "representing home health and rehabilitation equipment suppliers, claimed that they did not track prices in different geographic areas." The Health Industry Manufacturers Association (HIMA), representing major producers of medical equipment, had done research on geographic variation in equipment prices. However, citing proprietary data, HIMA refused to relate to the Urban Institute their findings. The inability and/or refusal by these associations to cooperate with the Urban Institute is particularly disappointing because these associations have the potential to provide geographic price information on a large variety of equipment types rather than just one or two items. The Urban Institute also investigated the ***Current Industrial Reports*** series produced by the U.S. Bureau of the Census. The Census data, which is time series in nature, is not suited for studying geographic price variation.

Based on information from the ***Medical Device Registry*** and the ***Health Industry Buyers Guide***, the Urban Institute identified and contacted four major manufacturers of medical equipment. The manufacturers indicated that there is some variation in the prices physicians pay for medical equipment with volume discounts accounting for a significant share of the price variation. However, the manufacturers did not indicate to the Urban Institute that the physician's geographic location was a factor in equipment price variation. Finally, following a suggestion from the Health Industry Distributive Association (HIDA), the Urban Institute contacted IMS America, a firm which provides marketing services to medical supply companies. Since the Center for Health Economics Research (CHER) had also contacted IMS for a study of hospital nonlabor input prices, discussion of IMS data is deferred to a review of our findings. Aside from (perhaps) IMS, the Urban Institute concluded that there were no reliable sources of input price data for medical supplies, medical equipment, and miscellaneous expenses which could be used to geographically adjust physician payments.

CHER Hospital Nonlabor Index Report to HCFA

In a study of the geographic variation of nonlabor input prices paid by hospitals, CHER (1992) obtained and appraised data collected by both public and private organizations. Since CHER's report was an update and extension of a report by ProPAC (1989) on the same subject, the review encompasses ProPAC's results.

CHER obtained seven secondary input price data series - about the same inputs as the ProPAC obtained. Only one of the data series CHER obtained, commercial telephone, might be part of the physician practice market basket. The other items either are not part of market basket (e.g., food) or are examined in another GPCI report (e.g., malpractice insurance). The prices of all of the hospital nonlabor inputs exhibited geographic variation. However, both CHER and ProPAC found that while all of the input prices varied geographically, the prices were not highly correlated, and some correlations were even negative. Thus, if a nonlabor input price index were constructed, it would exhibit less geographic variability than most of its constituents parts.

IMS America collects price data on medical supplies and pharmaceuticals purchased by 350 hospitals. According to IMS, their sample is a statistically representative sample of seven hospital size groups and the nine census divisions.[1] IMS collects paid invoices from the participating hospitals on a monthly basis. The invoices may reflect discounts from the manufacturer or distributor if they are given on specific products and not on the total amount purchased. Any discounts offered after the time at which the invoice was issued, such as rebates, are not recorded. The inconsistent handling of price discounts by IMS raises the possibility that its data might not be of sufficient quality for use in a geographic price index.

The IMS data is proprietary. IMS produces, for a substantial fee, both standardized and customized reports for its customers. Thus the quality of the IMS data has not been independently assessed. Since IMS has yet to disclose the identity of its participating hospitals, its claim that its sample is representative also cannot be verified at this time. Even if the sample is representative with regard to its primary sampling criteria, the sample may not be random. Many hospitals refuse to participate, even though IMS provides participating hospitals with free market share reports. Further, the sample size may be too small. Without more cooperation from IMS and substantial resources to assess the quality of the IMS data, IMS remains a source which may or may not prove to be useful in constructing price indices

[1]Secondary selection criteria include urbanicity, teaching status, and purchasing group participation.

for reimbursing hospitals and/or physicians. Finally, even if the IMS data were to prove adequate for hospital reimbursement, physicians might use medical supplies that hospitals do not purchase.

2.1.2 Results of HER Search Efforts

Rather than duplicate the Urban Institute's and CHER's previous efforts in contacting national trade associations, medical suppliers and equipment manufacturers, and IMS in order to determine the extent of geographic price variation, we decided to pursue new avenues of information. To this end, we contacted wholesalers and local distributors to gain insights how prices might vary geographically. Transportation firms were also contacted since the prices physicians pay for nonlabor input presumably reflect shipping costs.

Medical Supplies and Medical Equipment

In addition to shipping costs (discussed in the following section), there are several potential sources of geographic price variation. First, manufacturers might practice geographical price discrimination. That is, aside from shipping costs and volume discounts, manufacturers may charge different prices, for the same item, to distributors in different parts of the country.[2] Second, distributors' costs of doing business might vary geographically. And third, the degree of competition between local distributors might also affect the markup charged to physicians.

The first thing we did was to establish the degree to which physicians purchased medical supplies and equipment from local distributors, regional/national distributors, and directly from manufacturers. This was done to ascertain to what extent the market for these items are national or local/regional. For the most part, manufacturers do not directly process orders from individual physicians and physician groups unless the order is for medical equipment in excess of 20-25 thousand dollars. As noted earlier, manufacturers did not indicate to the Urban Institute that physician location, aside from shipping costs, played a role in equipment prices. This suggests that the market for X-ray machines, CT-scans, and MRIs is national. Of these expensive items, however, only X-ray machines are commonly present in physician offices.

[2]Arbitrage (elimination of price differentials) may be too costly to eliminate geographic price differentials.

As was found in previous efforts to obtain information on whether prices vary geographically, there is a dearth of hard data. There is some anecdotal evidence that *some* manufacturers charge west coast distributors more than in other areas. Several distributor and manufacturer representatives thought that the reason why west coast distributors would pay higher prices (instead of shipping in cheaper supplies/equipment from other areas) is because there are fewer distributors on the west coast and, therefore, less intense price competition between distributors. However, Baxter Healthcare, a major manufacturer of medical supplies, stated that except for volume discounts, it sold its products to all distributors at the same price. Additionally, ABCO Dealers, Inc., a cooperative of distributors located over the entire country, stated that, aside from shipping costs and volume discounts, distributors paid the same price regardless of location.

AmeriNet, a non-profit buying group operating out of St. Louis, sells a large range of products including pharmaceuticals, medical supplies, and medical equipment to customers over the entire country. AmeriNet sells mostly to hospitals, health maintenance organizations, nursing homes, and physician groups. Except for transportation costs, the prices AmeriNet charges do not vary geographically. Because of low volumes, AmeriNet does not sell products to individual physicians. Individual physicians tend to buy from local distributors. Because of local differences in the cost of business, prices charged to individual physicians might geographically vary as much as 20 percent (an estimate supplied by AmeriNet).

With regard to urban/rural differences, one distributor organization indicated that rural physicians pay higher prices than urban physicians. The reason offered is that rural practices are visited less by sales representatives of distributors than urban practices. Thus, the degree of competition among distributors may affect input prices paid by physicians. A distributor in the northeast, however, stated that rural physicians paid the same as urban physicians (see discussion below on shipping). Its possible that in the east, with its shorter distances between rural areas and urban areas, that there is no urban/rural price differential and that in other areas, there is a urban/rural price differential.

The preceding discussion indicates that there is mixed evidence for both regional and urban/rural price variation. This evidence, however, is based strictly on conversations with distributors. Further, the magnitude of the price differentials, if they exist, is not known. With regard to how variation in local costs of distributors affects prices charged by distributors to physicians, no hard data is available. Thus, the existence of geographic input price variation for medical supplies and equipment cannot be verified from available sources.

Shipping Costs

Costs of shipping products from manufacturers to wholesalers and distributors affect the prices charged by local distributors. Since manufacturers are scattered over the entire country,[3] it is unlikely that distributors in any one Census Region incur higher shipping costs than distributors in the other Census Regions. We were concerned, however, whether the prices paid by physicians located in rural areas were higher than those paid by physicians located in the nearest urban area because of higher shipping costs. Finally, because Alaska, Hawaii, and Puerto Rico are very distant from the mainland, it is quite likely that shipping costs increase the acquisition costs of inputs. To determine the impact of shipping costs, then, on the prices paid by physicians in rural areas, and off-shore locales, we contacted several shipping firms as well as local distributors.

Local distributors do not tend to charge different prices to urban and rural physicians for the same products because of transportation costs. That is, within their service or market area, they have one price (exclusive of volume discounts) for any given product.[4] Neither Federal Express (FedEx) nor United Parcel Service (UPS) charge extra for delivery to rural areas. FedEx, for instance, charges a flat rate of $52 to send a 40-pound package (second day economy service) from Boston to any business address on the U.S. mainland. Similarly, UPS charges $70.75 to ship a 70-pound package (second day air) from Boston to any business address on the U.S. mainland. While UPS does charge differential rates for ground transportation from Boston to other parts of the country, there is no urban/rural difference within a zone. Thus, a 70-pound package sent from Boston to anywhere in eastern Nebraska (zone 6 from Boston) would cost $17.68 regardless of whether it was sent to Omaha or Grand Island. Larger shipments (both physically and in value) usually are shipped via national trucking companies rather than by FedEx or UPS. National trucking companies such as Consolidated Freightways charge on the basis of delivery to local trucking terminals (even if the delivery is actually made to a business address). Like UPS, Consolidated Freightways charges the same rate regardless of whether the delivery is made to an urban or to a rural location within the same "zone."

Shipping costs to Hawaii, Alaska, and Puerto Rico are higher than to mainland destinations. For 40-pound package sent by second day air from Boston via FedEx, it would

---

[3]There may be concentrations of manufacturers in some areas (e.g., pharmaceutical manufacturers in Puerto Rico and CT-scans, MRIs, and X-ray machines in Ohio).

[4]Note, however, the preceding discussion regarding differences in competition among distributors with regard to urban and rural physicians.

cost an extra $5 to go Puerto Rico and an extra $10 to go to Hawaii or Alaska over the $52 that it would cost to a mainland destination. For UPS, the situation is a little more complicated because of the ground/air options. To send a 70-pound package from Boston to Miami by second day air via UPS would cost $70.75 whereas it would cost $75.50 to go to Puerto Rico. Similarly, a package from Boston to the west coast would cost $70.75 whereas to go to Hawaii and "urban" Alaska would cost $84.00 and to rural Alaska would cost $92.75.[5] Because ground transportation is an option for mainland destinations, ground air freight differentials to non-mainland destinations potentially understate the shipping differential to Alaska, Hawaii, and Puerto Rico. As was the case for ground transportation, larger shipments are handled by carriers other than FedEx and UPS. We contacted Emery Worldwide, a well-known air shipper of large items. To send a 500-pound item from Cleveland to Honolulu or Anchorage would cost about $1,400 while to San Francisco, it would cost about $1,100 - a differential of 27 percent. The differential (for the same 500-pound shipment) between Miami and Puerto Rico is 14 percent.[6] Even larger shipments to non-mainland destinations would be sent by a combination of trucking and ocean ships. Since shipping by ocean ships is cheaper than by air, the overall shipping cost differential from the west coast to Alaska and Hawaii is probably less than indicated by Emery's rate differentials. Our best guesses at the overall shipping cost differentials are 25 percent for Alaska and Hawaii and 15 percent for Puerto Rico. Shipping costs, however, are only part of the overall acquisition costs of equipment and supplies. Thus, the shipping cost differentials that might be incorporated into price indices for medical supplies and medical equipment would be lower than the preceding estimates.

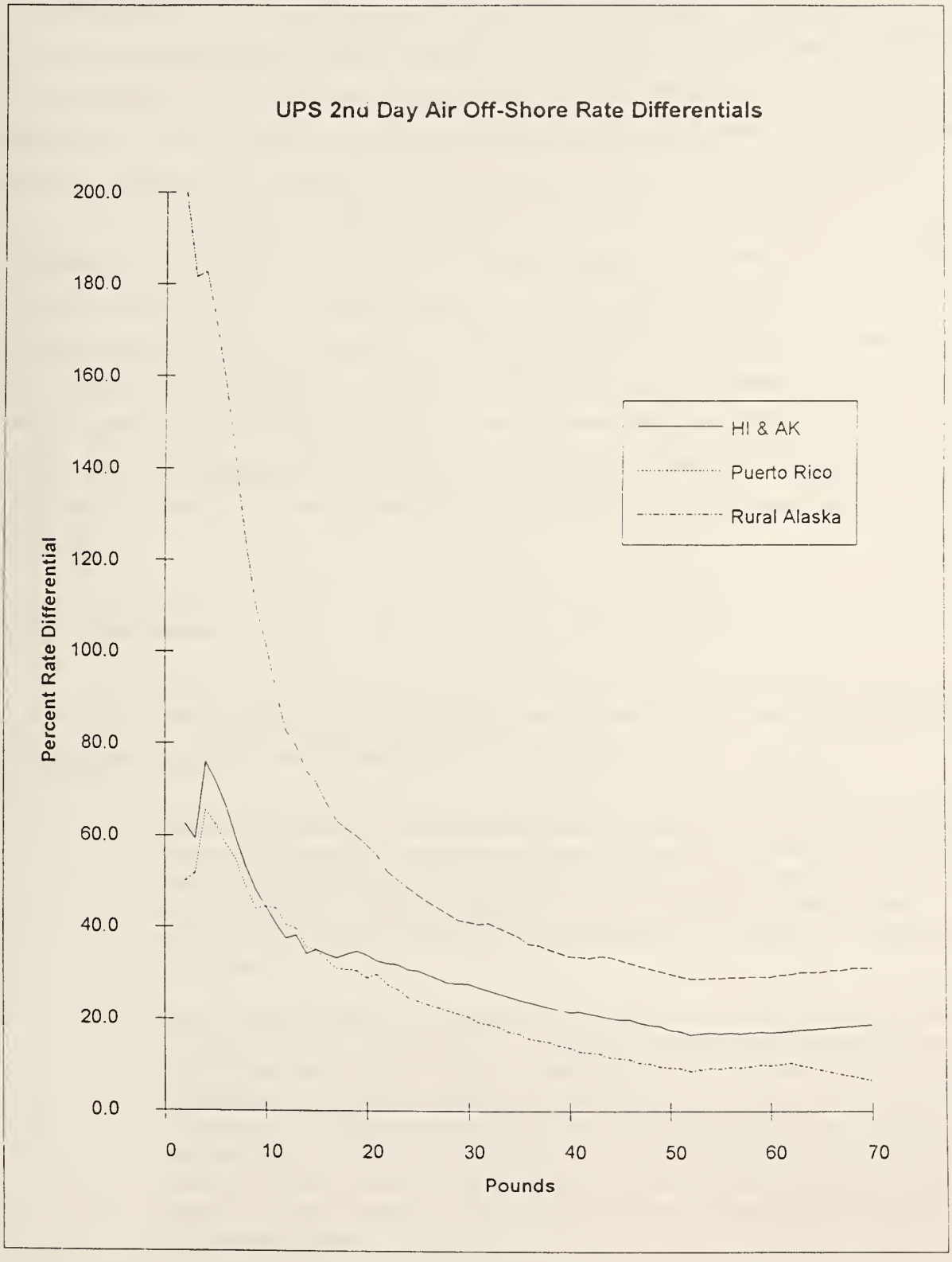
Miscellaneous

The amount of geographic price variation of items in the miscellaneous category varies. For instance, the prices of national journals and memberships in national professional associations do not have any geographical variation. Legal services, accounting services, and

[5]The differentials of 18.7 percent for "urban" Alaska and Hawaii, 6.7 percent for Puerto Rico, and 31.1 percent for rural Alaska are for a 70-pound item only. The percentage differentials are higher at lower weights. On average, the differential declines by .623 percentage points for each additional pound. The inverse relationship between the percentage differential and weight, however, is not completely linear nor completely consistent (see Figure 2-1).

[6]Crates and other shipped objects that take up more space (higher volume), for a given weight, are charged higher rates.

FIGURE 2-1 UPS RATE DIFFERENTIALS BETWEEN MAINLAND AND OFF-SHORE DESTINATIONS (2nd DAY AIR), FEBRUARY 1992



computer programmer expenses have a large labor component that probably can be measured by the salaries of such professionals. Professional salaries can be obtained from the 1990 Census and can be aggregated to nearly any desired geographic definition. Professional automobile is a difficult category to analyze because of the amount of individual bargaining before a final sales price is agreed upon and the difficulty of specifying a representative automobile. Some information on geographic differences in automobile costs may be purchased from Runzheimer, International, located in Milwaukee, Wisconsin.

The price or cost of continuing education (CE) also can vary considerably. Local hospitals often provide free CE to staff physicians during grand rounds. CE mail courses exist and their prices do not geographically vary. Some hospitals charge for intensive one or two-day courses. Non-local physicians would not only have to pay the course fee but also incur transportation and lodging expenses. Finally, CE is annually rotated so that one region of the country does not always have the lowest transportation costs. The costs for this type of CE will not vary geographically (except, perhaps, for an urban-rural transportation differential). Determining the typical CE mix of physicians and the "prices" paid is very difficult.

2.1.3 Conclusions

The following are the major conclusions we reached from our search for information on supplies, equipment, and miscellaneous input prices:

1. There is currently no data available that is adequate to determine geographic variation in medical supplies, equipment, and miscellaneous input prices. The same conclusion was reached in a recent Urban Institute report to HCFA (Zuckerman *et al.* 1992). The only databases that may warrant further consideration are the IMS America Hospital Supply Index and pharmaceutical databases.

2. The anecdotal/interview evidence on geographic variation in supplies and equipment prices is conflicting. Generally, it appears that manufacturers charge uniform prices, aside from shipping costs. Distributors' (wholesalers') prices may vary because of the local cost of doing business and competitive conditions. Larger physician groups are likely to be able to buy through national distributors with uniform prices, again aside from shipping costs. Solo practitioners and small group physicians are more likely to buy from local distributors with varying prices. Larger groups are also likely to receive volume discounts.

3. Shipping costs to Alaska, Hawaii, and Puerto Rico are higher than to mainland United States destinations. However, shipping costs to rural areas do not appear to be higher than to nearby urban areas.

2.2 Primary Data Collection

Among the problems of secondary data on input prices is lack of comprehensiveness. That is, price information may be available only for a few inputs. Another problem is that there is no hard data, only impressions and/or anecdotes of uncertain validity. Further, the extreme heterogeneity of the "miscellaneous" expense category makes it difficult to obtain reliable secondary data. One way of obtaining more comprehensive price data is to conduct a survey. This section reviews basic survey design issues and discusses the relative merits of surveying physicians and equipment and supply firms.

2.2.1 Design Issues for a Survey of Input Prices

Given the hundreds, if not thousands, of types of medical supplies and equipment used in physician offices, it is necessary to select representative inputs for a survey. One major criteria for selection is that the medical supply or equipment is common to many practices. Another is that the item is believed to exhibit the same price variation as other inputs. It would probably be necessary to convene a panel of physician experts to specify the supplies and equipment that should be in the survey. To accommodate the distinctive equipment of specialists,[7] the survey's sample size needs to be very large in order to obtain statistical power. The overall sample size also has to be large enough so that the appropriate geographical categories have enough observations to support the construction of a geographic price index. This means that MSAs should not be the geographic level of the survey because of the large number physicians that would have to be surveyed. At the other extreme, using the four census regions would likely result in considerable intra-region variation. One possibility is to use the nine census divisions and, within each census division, define areas as rural, small MSA, and large MSA. Such a strategy would result in 27 areas to be sampled. Given the necessity of obtaining sufficient specialist respondents, 27 areas is probably the best comprise between accuracy and costliness of the survey.

---

[7]For instance, ophthalmologists have YAG laser machines, photo slit lamps, and automated visual filed test equipment machines whereas most internists and family practitioners do not use such specialized equipment (Center for Research in Ambulatory Health Care Administration, 1991).

Once representative supplies and equipment have been specified, it is also necessary to obtain information on unit prices (instead of the total amount spent on the items) and on the characteristics of the product. For instance, bandages may be 2-ply or 6-ply while non-adherent dressings may be non-medicated wet, medicated wet, or dry. It is even more important for equipment that product characteristics are obtained because rapid technological change can dramatically affect prices. For instance, CT-scanners, which used to be only housed in hospitals, are now present in some physician practices. For clinical chemistry testing equipment, the ability to perform tests on, for instance, blood uric acid, blood urea, serum cholesterol, and glucose need to be taken into account as well as whether the equipment performs automated multi-channel tests. Because of price inflation and because some changes of attributes may not be easily specified, it is important to know the year in which the equipment was purchased. Because of technological change, prices tend to be discounted on used equipment, thus data on whether the equipment was purchased new or used needs to be obtained. For instance, Abbott sold Vision 1, a chemistry analyzer, in 1989/90 for $15,000 new. Today, because of technological change, a three year old used machine sells for about $1,500 even though the machine still has plenty of physical life left in it. Finally, the costs of maintenance contracts need to be factored in because the price for some equipment includes maintenance.

While many if not most physicians purchase rather than rent/lease equipment, a non-trivial number of physicians do rent or lease equipment (see Table 3-1). In addition to the basic rental/lease price, other terms of the lease agreement such as its term and whether maintenance is included need to be obtained. One attraction of lease and rental agreement prices is that annualized values can be readily obtained. Having annualized values would be useful because medical equipment has a lifespan of several years. Thus, from an analytical viewpoint, leased and rented equipment prices do not need to be standardized as much as purchase prices. Fewer data adjustments would likely produce more reliable estimates of geographic input price variation.

If the survey is to provide values for the construction of an actual index to geographically adjust payments, then cost shares for the medical supplies, equipment, and miscellaneous categories need to be developed. Two ways to develop cost shares are: (1) rely on existing survey of physician expense data such as PPCIS and SMS; or (2) a new survey of physicians that obtains cost share information in addition to unit prices.

2.2.2 Types of Primary Surveys

Survey of Physicians

A survey of physicians would offer the following advantages. First, actual transaction prices (including shipping costs) instead of list prices would be obtained. Second, the prices would be actual equipment purchased rather than hypothetical equipment. Third, price information on items in the miscellaneous category can be obtained. A survey of physicians would have some problems. First, physicians may not be able to accurately recall the purchase/rental cost or the year in which the equipment was purchased. Similarly, they may not remember if the equipment was purchased new or used. Third, they may not know the relevant attributes of the equipment/supplies. Fourth, a survey of physicians would be quite expensive. It would be more expensive than HCFA's Physician Practice Cost and Income Survey (PPCIS) because more physicians need to be surveyed, more types of supplies and equipment would have to be covered than by the PPCIS, and more questions would have to be asked regarding each input than in the PPCIS. Thus a primary survey of physician would cost considerably more than the 1988 PPCIS (which cost more than 2.8 million dollars).

Survey of Suppliers

One problem with surveying physicians is the large sample size needed to obtain enough representative physicians in the major specialties. This suggests the possibility of a survey of suppliers. The problem here is that physicians buy from a large variety of suppliers: local distributors, regional/national distributors, and, for major equipment, directly from manufacturers. This means that the survey design may have to be quite complex. The identification of the supplier could also be quite difficult. Aside from major manufacturers such as General Electric that are readily identifiable, it will quite costly to identify local and regional/national distributors. Other problems may include the unwillingness of suppliers to divulge what they regard as proprietary data. Even if they are willing to participate, they may not want to take the effort to provide actual transaction data, but rather just list prices.

2.3 Concluding Comments

Given the lack of reliable input price data, the existence and/or extent of actual geographic input price variation can only be verified by a comprehensive survey of

physicians or suppliers. A survey of physicians would be preferable to a survey of suppliers. The reasons are as follows. First, HCFA and other organizations have considerable experience in surveying physicians but little experience in surveying suppliers. Second, the design of a physician survey would be less complicated than would a survey of suppliers because of a readily available sampling frame (the AMA Masterfile).

3.0 ANALYSIS OF PHYSICIAN SURVEY DATA

In this chapter we analyze survey data collected from physician practices to determine what it reveals about geographic variation in the prices of supplies, equipment, and miscellaneous inputs. Our data source is the 1988 HCFA Physician Practice Costs and Income Survey (PPCIS). Several similar analyses have been completed previously using American Medical Association (AMA) Socioeconomic Monitoring System (SMS) data. We begin by reviewing the results of these studies, in Section 3.1. We also discuss in this section the limitations of using expenditure data to infer price variation. Section 3.2 then presents our analysis of the PPCIS data. The PPCIS contains practice expenditures for supplies, equipment, and miscellaneous, similar to the SMS. In addition, however, an equipment supplement to the PPCIS collected data on purchase prices of several types of equipment used in physician practices. The PPCIS equipment supplement is a unique source of data that we use to study geographic variation in equipment prices. Subsections of Section 3.2 discuss the PPCIS survey and data, our analytical methods, results on geographic expenditure/price variation, and correlations of expenditure/price variation with other GPCI price indices.

3.1 Review of Previous Studies

3.1.1 AMA Study

Two previous studies have used AMA SMS data to examine geographic variation in physician expenditures and input prices. Researchers at the AMA (Gillis, Reynolds, and Willke, 1992) used SMS data to analyze the validity of GPCI price indices. Annual data from 1984 to 1991 was used in the analysis of physician supply expenditures. To approximate a price for medical supplies, reported supplies expenses were divided by an estimate of annual patient visits, under the assumption that supplies are a variable expense directly related to the number of visits. (It is not clear whether office or total patient visits were used as the denominator.) This "supplies price" was then regressed on dummy variables for Medicare payment localities and physician specialty. Gillis *et al.* found that the supplies price proxy varied significantly (in a statistical sense) across localities. They also tested the correlation of the supplies price proxy with the GPCI office rent, nonphysician employee wage, malpractice insurance, and physician work price indices. The nonphysician employee wage was the most highly correlated with the supplies price proxy, with an estimated elasticity of the supplies

price with respect to the wage index of .33. However, Gillis *et al.* considered the supply price proxy to be "especially weak" because of the lack of a good quantity measure of supply inputs. Thus, their analysis of it was limited to testing for geographic variation and correlation with other GPCI price indices. Gillis *et al.* did not analyze equipment or miscellaneous expenses because of the lack of a good quantity input measure to construct a price proxy. Their conclusion was that the apparent variation of supply prices across localities suggests that a price proxy may need to be constructed for supplies expenses.

3.1.2 Urban Institute Study

The Urban Institute recently submitted a report to HCFA that reexamined the price indices used in the GPCI (Zuckerman, Miller, Wade, and Pauly, 1992). Part of the evaluation involved analysis of 1990 and 1991 SMS expense data for supplies, equipment, and "other" inputs, and for the sum of these categories. The dataset the AMA made available to the Urban Institute did not include measures of physician outputs, such as visits. Therefore, prices were approximated by dividing expenses by the number of non-physician personnel.

Expenses per nonphysician personnel were regressed on a set of payment locality (some localities were aggregated by the AMA for confidentiality reasons) and specialty dummy variables. The null hypothesis of no geographic variation (among localities) was rejected for all expense categories. Zuckerman *et al.* suggest that this implies that the current lack of any variation in the supplies, equipment, and miscellaneous components of the GPCI should be reconsidered.

In addition, expenses per employee were regressed on various permutations of the GPCI office rental and nonphysician employee wage indices. In these regressions, the nonphysician employee wage index (based on 1980 Census wage data) had the largest elasticities. For the sum of supplies, equipment, and miscellaneous, and for equipment, the elasticity was not significantly different from 1.0, implying a proportional relationship. For supplies, the elasticity was significantly less than 1.0, and for miscellaneous, it was significantly greater than 1.0.

Zuckerman *et al.* suggest that an "ad hoc" price adjustor for supplies, equipment, and miscellaneous (individually or summed) could be created from the GPCI nonphysician wage or office rental indices. The adjustment would be defined by the price index's coefficient (elasticity) in the regression of supplies, equipment, or miscellaneous expenses on it. For example, if the elasticity of Census wages in the double logarithmic regression of supplies

per employee on wages was .43, the adjustor would be the Census wage raised to the .43 power. A similar approach was used in constructing the geographic capital cost adjustor in Medicare's Prospective Payment System for hospitals from the PPS area wage index.

How to choose among the various possible "ad hoc" adjustors is not entirely clear because none of them have much face validity. One basis on which to choose would be percentage of variation in expenses explained, but Zuckerman *et al.* do not report the R-squares from their regressions. They seem to favor ad hoc adjustors that have a nearly proportional relationship to expenses. It is not clear why this should be a criterion, however, because the relationship can always be made proportional by transforming the independent variable (e.g., raising it to the power of its expense elasticity).

3.1.3 Limitations of Using Expenditure Data to Infer Input Price Variation

After reviewing these two previous studies, but before presenting our own analysis of physician survey data, it is useful to recognize the limitations of using expenditure data to infer input price variation. By definition, expenditures E for a practice input are the product of price P and quantity Q:

$$E = PQ(P, X). \qquad (1)$$

Quantity purchased is a function of price and other factors X. From equation (1), it is clear that expenditures varies directly with price only if quantity is fixed. That is, expenditures is a good measure of price variation only if physician demand for an input is totally inelastic with respect to price. If demand is unit elastic, expenditures will be constant even if price varies, and thus will yield no information about price variation. If demand is unit elastic, a 10 percent higher price would be offset by 10 percent lower quantity. If demand is elastic, expenditures will actually vary inversely with price. For example, prices might be lower in urban areas, but, if their demand is elastic, urban doctors would spend more on the input. Thus, expenditure variation does not necessarily reveal anything about price variation: expenditures may vary directly, not at all, or inversely with price.

Other factors X besides price may also affect quantity of inputs purchased and thus weaken any relationship between price and expenditures. If these factors are uncorrelated with geography (which is used as a proxy for the unmeasured price), the price/expenditure relationship will be weakened, but not biased. However, there is reason to believe that some

factors that affect quantity are correlated with geography. For example, the types of patients seen could differ by area. Sicker patients may be more likely to travel to urban areas to be nearer to more extensive medical facilities. Therefore, urban physicians may see a systematically more difficult casemix than rural physicians, and thus use a greater quantity of supplies, equipment, and other inputs. Urban areas may also have more substitutes and complements (e.g., hospitals, ambulatory surgery centers, free-standing imaging centers) to physician services available, so physicians may stock fewer supplies in their offices. On the other hand, urban physicians may have more "high-tech" resources to work with. In practicing a more aggresive style of medicine, they may use more supplies and equipment. Regional differences may also exist. Hospital length of stay is shorter in the west, so western physicians may see sicker patients in their offices and use more resources. Thus, the coefficients of urban-rural, regional, and payment locality in regressions of expenditures on geography may reflect variations in quantity, not in price.

In a regression equation, of course, "control" variables can be added to attempt to hold constant the quantities of inputs used, and thus isolate price variation. However, many of the factors affecting quantity are difficult to measure. Moreover, the same "control" variables may be correlated with both quantity and price. It then becomes very difficult to distinguish price from quantity variation. Even controlling for specialty, which is usually seen as the most basic factor to hold constant in an expenditure regression, can introduce biases. Specialists are more common in urban areas, so physician specialty is correlated with any urban-rural differences in input prices. Controlling for specialty may inadvertently reduce or eliminate the urban-rural price difference the analyst intends to measure in an expenditure regression.

The best situation occurs when a good measure of quantity of the input is available on the physician survey. For example, square feet of office space was collected on both the 1988 PPCIS and recent SMS surveys and can be used as a quantity measure for office costs (cost per square foot). The AMA researchers (Gillis *et al.*, 1992) used visits as a quantity measure for supplies, but considered it to be inadequate. They did not analyze equipment or miscellaneous inputs at all because of lack of a quantity measure. The Urban Institute researchers (Zuckerman *et al.*, 1992) were forced to use nonphysician employees as the quantity measure for all their inputs. Employees is clearly a crude approximation to the desired quantity measures. For this reason, the results of the Urban Institute report must be interpreted cautiously.

In short, analysis of expenditure data may reveal little or nothing about price variation. However, because almost no price data are available, expenditure data have been analyzed by us and other researchers. Results of these analyses must be interpreted cautiously and compared with a priori expectations and other information. Maintained assumptions (e.g., about the price elasticity of demand) should be kept in mind. Nevertheless, in the absence of price data, analysis of expenditures may be useful if interpreted properly.

3.2 Analysis of PPCIS Practice Costs and Equipment Prices

This section consists of four subsections. The first is a brief description of the PPCIS, the source of the data used in the analyses. Second, construction of analytical variables is discussed. Third, the results of the univariate and multivariate analysis are presented. Fourth, the use of current GPCI price indices as proxies to geographically adjust payments for medical supplies, medical equipment, and miscellaneous expenses is considered.

3.2.1 Description of the 1988 Physicians' Practice Costs and Income Survey

The data used in the descriptive and econometric analyses are from the 1988 Physicians' Practice Costs and Income Survey (PPCIS). This was a telephone survey of physicians conducted by the National Opinion Research Center (NORC) for HCFA. The sample universe was nonfederal physicians who spent at least 20 hours per week in patient care and had completed their residencies. All specialties and group sizes were sampled, but physicians employed by hospitals, clinics, HMOs, and faculty practice plans were excluded. That is, only self-employed physicians or physicians employed by another physician or group of physicians were surveyed. The weighted response rate to the overall survey was 61 percent. Questions regarding practice expenses for medical supplies, medical equipment (depreciation, interest, leases, and rentals), and miscellaneous expenses (including professional automobile and continuing education) were part of the main survey.

HCFA developed an equipment supplement to the PPCIS concerning physicians' ownership, rental, and lease arrangements as well as investments in selected types of medical equipment. The equipment supplement was divided into two main categories: (1) diagnostic medical equipment and (2) laboratory equipment. The diagnostic testing section gathered purchase prices of 12 types of diagnostic equipment, including those requiring an expensive piece of equipment like magnetic resonance imaging (MRI), or a widely diffused and less

expensive device such as a sigmoidoscope. Physicians in all specialties were asked for the purchase price of three common types of diagnostic equipment and their use: X-ray, routine EKG, and diagnostic ultrasound. Questions on the remaining equipment were specialty-specific (see Table 3-1). Physicians in all specialties were asked about all four types of laboratory equipment.

3.2.2 Methods

Neither the practice expenses variables nor the equipment "price" variables were suitable for analysis without (separate) standardization procedures. The reason these variables needed to be standardized is because the objective of the analysis is to determine geographic *price* variation. The practice expense variables are the result of unit prices times the number units of input purchased.[1] The equipment price variables are a mixture of prices for single pieces of equipment and expenditures on multiple pieces of equipment.[2]

There are three types of practice expense variables: medical supplies, medical equipment, and miscellaneous. Since the units of inputs of each of these variables were not requested on the PPCIS,[3] another method of standardization was developed. Medical supply expenses, after being divided by the practice's FTE physicians, were standardized by the responding physician's annualized number of office visits. This assumes that medical supplies are physically consumed in each office visit. That is, medical supplies are variable inputs. Medical equipment expenses and miscellaneous expenses, however, are relatively fixed inputs. While patient volume may affect the physical deterioration of medical equipment and business equipment, the allowable tax write-off is based on straight-line depreciation. The only "standardization" for medical equipment and miscellaneous expenses were in the multivariate analysis where the number of full-time equivalent physicians was included as an independent variable to control for the overall size of the practice.

---

[1]Even the depreciation and interest expense parts of the medical equipment and miscellaneous categories can be conceptualized in terms of price times quantity.

[2]In the equipment supplement of the PPCIS, the purchase price question was worded as follows: "What [was the <u>total</u> purchase price/are the annual (lease/rental) costs] of all the (INSERT) equipment currently (owned/leased/rented) by your practice?" "INSERT" refers to the type of equipment (e.g., X-ray) for which the question was asked. The word "all" in the questions means that the combined value of all equipment of a given type would be given as an answer.

[3]Which would have been difficult given the heterogeneous nature of the inputs within each of the three practice expense categories.

TABLE 3-1

NUMBER OF VALID OBSERVATIONS IN PPC'S EQUIPMENT SUPPLEMENT

Equipment	Purchased	Rented or Leased
Diagnostic		
X-Ray [a]	748	131
EKG [a]	1,021	98
Diagnostic Ultrasound [a]	473	130
Upper GI Endosopy [b]	105	19
Flexible Sigmoidoscopy [b]	390	31
Diagnostic Colonoscopy [b]	105	13
Cardiovascular Stress Test [c]	89	18
ECG [c]	142	63
ECG [d]	60	10
Cardiovascular Stress Test [d]	64	12
Myocardium [d]	11	5
CT Scan [e]	11	9
MRI [e]	10	4
Nuclear Scan [e]	7	2
Laboratory [a]		
Clinical Chemistry	576	137
Hematology	642	108
Microbiology	400	39
Histology	70	11

[a] All physicians.
[b] Internists, general and family practitioners, general surgeons, and gastroenterologists only.
[c] Internists, general and family practitioners only.
[d] Cardiologists only.
[e] Radiologists only.

Medical equipment purchase "prices" were standardized two different ways. First, they were divided by the number of full-time physicians in the practice and, second, by the annualized number of tests performed by each type of equipment. The number of observations available for analysis limited the types of equipment analyzed. The reason is that 100 observations are too few when analyzing geographic price variation, even over the four census regions. Thus equipment purchase prices analyzed are limited to X-ray, electrocardiographic monitoring (EKG), diagnostic ultrasound, flexible sigmoidoscopy, clinical chemistry, hematology, and microbiology (see Table 3-1). Further, after data editing, we were not able to analyze the rental or leasing of equipment because of too few observations; our anlaysis is limited to purchase prices.[4]

3.2.3 Geographic Variation in Practice Costs and Equipment Prices

A descriptive (univariate) analysis was not performed on the three practice expense variables. The reason is that even after standardization for the number of physicians and/or office visits, there would be considerable variation due to specialty mix. For instance, psychiatrists tend to have low medical supply and medical equipment costs relative to other specialties. Although there are between 1,776 and 2,663 overall observations for the practice expense variables, with sixteen specialties there are not enough observations per specialty to support a specialty-specific analysis of geographic variation.

Even after standardizing the equipment "prices," there was no control for the age (vintage) of the equipment, whether purchased used or new, equipment characteristics (e.g., ability to perform multi-channel tests), and multiple pieces of equipment. As one consequence of the lack of adequate controls, the equipment price distributions had many extreme values, to which mean prices were quite sensitive. Thus median prices, which are less influenced by extreme values than means, are presented in Table 3-2.[5] The medians sometimes indicate little variability while other instances, considerable variability. For X-ray machines and microbiology equipment, for instance, the purchase price per physician was identical in three of the four census regions. EKG machines had the same median in rural

---

[4]This loss was regrettable because the annualized value of rents and leases were available. The use of annualized rents and leases would have circumvented the problems posed by the multi-year lifespan of medical equipment.

[5]For meaningful comparison of prices in each area, medians only require that the median-priced equipment in each area has the same characteristics, not that the entire sample of equipment is comparable.

TABLE 3-2

MEDIAN EQUIPMENT PURCHASE PRICES BY CENSUS REGION AND URBANICITY

Type of Equipment	ALL	CENSUS REGION				URBANICITY		
		Northeast	Midwest	South	West	Rural	MSA Small	MSA Large
X-Ray								
Purchase price per MD	$10,492	$10,000	$10,000	$14,100	$10,000	$9,643	$12,000	$11,306
	(502)	(77)	(136)	(193)	(96)	(153)	(237)	(112)
Purchase price per test	21.59	20.43	19.23	25.64	25.80	17.09	24.26	23.08
	(454)	(64)	(125)	(179)	(86)	(139)	(212)	(103)
Electrocardiographic Monitoring (EKG)								
Purchase price per MD	1,667	1,500	1,333	1,875	1,500	1,500	1,500	1,800
	(689)	(146)	(157)	(243)	(143)	(217)	(291)	(181)
Purchase price per test	6.92	5.77	6.81	7.21	7.69	7.69	6.92	5.77
	(630)	(136)	(142)	(227)	(125)	(195)	(263)	(172)
Diagnostic Ultrasound								
Purchase price per MD	10,000	12,750	9,375	11,786	8,385	7,930	11,500	11,726
	(363)	(56)	(90)	(139)	(78)	(87)	(184)	(92)
Purchase price per test	67.31	79.33	67.31	70.83	48.08	73.22	64.10	74.18
	(318)	(50)	(79)	(126)	(63)	(74)	(162)	(82)
Flexible Sigmoidoscopy								
Purchase price per MD	2,350	2,500	1,500	1,975	3,000	1,750	2,000	3,400
	(271)	(44)	(71)	(88)	(68)	(81)	(119)	(71)
Purchase price per test	25.64	20.60	22.44	25.00	34.13	33.65	20.19	25.64
	(239)	(41)	(63)	(77)	(58)	(72)	(104)	(63)
Clinical Chemistry								
Purchase price per MD	3,333	2,766	3,000	4,000	2,500	3,585	3,333	2,950
	(393)	(61)	(111)	(159)	(62)	(154)	(159)	(80)
Purchase price per test	2.88	3.61	1.92	2.88	5.16	2.98	2.64	3.61
	(341)	(49)	(98)	(140)	(54)	(134)	(138)	(69)
Hematology								
Purchase price per MD	1,464	1,050	1,000	2,417	1,000	1,250	1,350	1,750
	(412)	(66)	(107)	(158)	(81)	(163)	(170)	(79)
Purchase price per test	1.92	1.54	1.40	2.56	1.92	1.73	1.54	3.27
	(363)	(56)	(93)	(143)	(71)	(139)	(154)	(70)
Microbiology								
Purchase price per MD	500	300	500	500	500	460	500	333
	(237)	(37)	(53)	(85)	(62)	(86)	(100)	(51)
Purchase price per test	1.10	0.58	1.15	1.15	1.10	1.10	1.38	0.77
	(215)	(31)	(48)	(81)	(55)	(75)	(94)	(46)

Note: Number of observations are in parentheses.

Source: 1988 HCFA Physician Practice Cost and Income Survey.

areas and small urban areas. For other types of equipment, the medians reveal considerable geographic variation - 30-40 percent is not uncommon and there are several instances in which the highest median is about twice as large as the lowest median. The two methods of standardizing equipment prices give somewhat different results. Equipment prices standardized on the number of physicians indicate that input prices are often highest in the south and large urban areas and lowest in rural areas. Prices standardized on the number of tests indicate that input prices are often highest in the west and large urban areas, and lowest in the midwest, northeast, and small urban areas.[6] Overall, though, there are no strong patterns, which is consistent with random variation due to lack of controls for vintage and other characteristics.

Part of the variation displayed by the medians in Table 3-2 could be due to characteristics that were not controlled for such as whether clinical chemistry equipment could perform multi-channel tests. Multivariate analysis was employed on all of the equipment price variables listed in Table 3-2 and on the three practice expense variables. For all regressions, the dependent variable was the natural logarithm of the expense or price variable. This means that if a physician reported zero expenses or zero price, the observation was excluded from analysis. This is appropriate given that the purpose of the study is to determine price variation. Independent variables common to all regressions were census region dummy variables (northeast is the omitted region), urbanicity dummy variables (rural is the omitted category), and specialty (general/family practice is the omitted specialty). Specialty variables are included because some specialties may buy/lease more expensive machines than others, or use a different mix/quality of supplies and miscellaneous inputs.[7] Some regressions had additional independent variables. The equipment and miscellaneous expense regressions included the natural logarithm of the number of full-time equivalent physicians in the practice to control for practice size. The diagnostic ultrasound, clinical chemistry, and hematology regressions included attributes such as the types of tests the machines could perform and whether the machines could perform automated multi-channel tests. Finally, outlier trims were applied to all regressions: the upper and lower 10 percent of equipment prices were dropped from analysis with less severe trims on the practice

[6] In no circumstance does one area have the *majority* of high or low medians.

[7] The control for specialty is probably most important with regards to machines for which we do not have information on special characteristics or on overall capacity.

expense variables. The magnitudes of geographic coefficients are sensitive to extreme values of the dependent variable - partly because of omitted (unavailable) qualitative controls.

The results of the practice expense regressions are presented in Table 3-3. Because of the large number of equipment price regressions, only one, for EKG machines, is presented, in Table 3-4. The medical supplies expense per visit regression had the largest regression coefficients on the census region variables, and they suggest much lower expenses in the northeast. While all three of the census region variables were statistically significant in the supplies regressions, neither of the urbanicity variables were (and they also had much smaller regression coefficients). All three of the census region variables were statistically significant in the miscellaneous expense regression but had much smaller magnitudes than in the supplies regression. Again, neither urbanicity variable was significant in the miscellaneous regression and the magnitudes of their coefficients were smaller than the census region coefficients. Only one geographic dummy variable was statistically significant in the equipment regression - although the magnitudes of the geographic coefficients were similar to the miscellaneous expense geographic coefficients. Overall, seven of the nine census region regression coefficients are statistically significant in the three practice expense regressions but *none* of the urbanicity variables were statistically significant. One possible reason why all of the census region variables have positive signs is that physicians in the northeast may be more likely than physicians elsewhere to use hospitals or other nonoffice settings more intensively (e.g., have tests performed in hospitals rather than in their office).

Unlike the practice expense regressions, the census region variables were rarely statistically significant in the equipment price regressions (not shown). Conversely, there were several statistically significant urbanicity variables, more than can be accounted for by chance alone. The signs on the urbanicity variables (rural was the omitted category) were usually positive, indicating rural physicians faced lower input prices than urban physicians. While the equipment regressions generally had very low adjusted R squares, there were several that had values .15 or higher.

To determine whether there is statistically significant geographic variation in expenses and equipment purchase prices, F tests for the joint significance of the geographic variables were performed. The results of the F tests are in Table 3-5. In the first set of columns, the test is for the presence of regional differences, in the second set of columns the test is for differences by urbanicity, and in the final set of columns, the test is for either regional or urbanicity effects.

TABLE 3-3

PRACTICE EXPENSE REGRESSIONS

	Medical Supplies Expense Per Visit	Miscellaneous Expense	Equipment Expense
Intercept	-0.400 ***	-0.994 ***	-1.038 ***
	(0.094)	(0.062)	(0.124)
Midwest	0.257 ***	0.146 ***	0.144
	(0.081)	(0.051)	(0.104)
South	0.333 ***	0.100 **	0.163 *
	(0.074)	(0.047)	(0.095)
West	0.254 ***	0.138 ***	0.139
	(0.080)	(0.051)	(0.102)
Small MSA	0.031	0.050	0.052
	(0.066)	(0.042)	(0.082)
Large MSA	0.078	-0.002	-0.101
	(0.075)	(0.048)	(0.098)
Internal Medicine	0.060	0.089	0.111
	(0.096)	(0.067)	(0.126)
Cardiology	0.290 **	0.272 ***	0.473 ***
	(0.140)	(0.098)	(0.183)
Gastroenterology	0.305 **	0.253 ***	0.331 *
	(0.136)	(0.091)	(0.176)
Other Medical	0.276 **	0.073	-0.116
	(0.109)	(0.074)	(0.144)
General Surgery	0.081	0.201 ***	-0.085
	(0.114)	(0.076)	(0.150)
Orthopedic Surgery	0.398 ***	0.444 ***	0.492 ***
	(0.136)	(0.093)	(0.171)
Ophthalmology	-0.189	0.485 ***	0.931 ***
	(0.124)	(0.090)	(0.163)
Urology	0.464 ***	0.166 **	0.172
	(0.119)	(0.081)	(0.158)
Obstetrics/Gynecology	0.246 **	0.209 ***	0.091
	(0.108)	(0.075)	(0.144)
Cardiovascular Surgery	0.109	0.362 ***	0.634 ***
	(0.142)	(0.095)	(0.195)
Other Surgery	0.277 **	0.313 ***	0.403 ***
	(0.118)	(0.084)	(0.156)
Psychiatry	-0.750 ***	-0.115	-0.823 ***
	(0.160)	(0.082)	(0.216)
Anesthesiology	---	0.032	-0.893 ***
		(0.084)	(0.227)
Radiology	---	0.179 *	0.399 **
		(0.093)	(0.201)
Other Specialities	0.165	0.196 **	-0.522 **
	-(0.185)	(0.095)	(0.209)
Log FTE MDs	---	1.002 ***	0.992 ***
		(0.017)	(0.032)
Observations	1754	2436	1614
Adjusted R Squared	0.047	0.624	0.410
F	5.772 ***	193.499 ***	54.436 ***

*Indicates statistical significance at the 10 percent level.

**Indicates statistical significance at the 5 percent level.

***Indicates statistical significance at the 1 percent level.

gpci\pracexp\sem\TAB3-3.XLS

NOTE: Standard errors are in parentheses. Equation estimated by ordinary least squares.

TABLE 3-4

ELECTROCARDIOLOGY EQUIPMENT (EKG) PRICE REGRESSIONS

	EKG Price per Test	EKG Price per MD
Intercept	0.113	-0.078
	(0.121)	(0.105)
Midwest	-0.117	-0.093
	(0.120)	(0.105)
South	-0.136	0.102
	(0.108)	(0.093)
West	0.029	0.054
	(0.119)	(0.103)
Small MSA	0.017	-0.144 *
	(0.096)	(0.084)
Large MSA	-0.027	0.004
	(0.110)	(0.096)
Internal Medicine	-0.208 **	0.173 **
	(0.101)	(0.088)
Cardiology	-0.124	0.475 ***
	(0.132)	(0.120)
Gastroenterology	0.097	-0.105
	(0.165)	(0.139)
Other Medical	0.098	0.051
	(0.162)	(0.136)
General Surgery	0.271	0.107
	(0.228)	(0.192)
Orthopedic Surgery	0.252	-0.169
	(0.505)	(0.399)
Ophthalmology	0.425	0.883 **
	(0.312)	(0.397)
Urology	0.664	-0.338
	(0.440)	(0.329)
Obstetrics/Gynecology	0.062	-0.064
	(0.312)	(0.234)
Cardiovascular Surgery	-0.337	-0.130
	(0.236)	(0.208)
Other Surgery	---	0.866
		(0.560)
Anesthesiology	0.818 **	0.595 *
	(0.394)	(0.357)
Radiology	0.223	-0.501
	(0.501)	(0.557)
Other Specialities	0.037	-0.049
	(0.394)	(0.360)
Observations	509	556
Adjusted R Squared	.018	.049
F	1.508 *	2.493 ***

*Indicates statistical significance at the 10 percent level.

**Indicates statistical significance at the 5 percent level.

***Indicates statistical significance at the 1 percent level.

NOTE: Standard errors are in parentheses. Equation estimated by ordinary least squares.

TABLE 3-5

F TESTS ON GEOGRAPHIC VARIABLES IN EXPENSE/PRICE REGRESSIONS

	GEOGRAPHIC VARIABLES					
	Census Region		Urbanicity		All	
Regression	F Statistic	Significance	F Statistic	Significance	F Statistic	Significance
Physician Expenses						
Supply expenses per MD office visit	7.038	0.000 *	0.557	0.573	4.255	0.001 *
Miscellaneous Expenses	3.419	0.017 *	1.147	0.318	2.729	0.018 *
Equipment Expenses	1.079	0.357	1.673	0.188	1.634	0.148
Medical Equipment Purchase Price						
X-Ray price per MD	2.141	0.095	1.351	0.260	1.567	0.168
X-Ray price per test	2.601	0.052	1.150	0.318	2.076	0.068
EKG price per MD	1.511	0.211	2.239	0.108	1.819	0.107
EKG price per test	1.064	0.364	0.100	0.905	0.663	0.651
Ultrasound price per MD	0.433	0.729	0.081	0.922	0.269	0.930
Ultrasound price per test	0.495	0.686	3.666	0.027 *	1.982	0.082
Sigmoidoscopy price per MD	1.637	0.182	2.112	0.124	2.380	0.040 *
Sigmoidoscopy price per test	0.577	0.631	2.731	0.068	1.573	0.170
Clinical chemistry price per MD	1.204	0.309	0.325	0.723	1.040	0.395
Clinical chemistry price per test	6.648	0.000 *	0.369	0.692	4.053	0.001 *
Hematology price per MD	4.604	0.004 *	0.836	0.434	2.999	0.012 *
Hematology price per test	2.142	0.095	4.858	0.009 *	3.617	0.004 *
Microbiology price per MD	0.653	0.522	2.315	0.102	1.077	0.375
Microbiology price per test	2.407	0.093	0.906	0.406	1.382	0.234

*Statistically significant at 5% level.

Among the practice expense regressions, the census region variables were jointly significant in the supplies and miscellaneous regressions but not the equipment regression. The urbanicity variables were not jointly significant in any of the three practice expense regressions. As might be expected by the previous discussion of the results, *all* geographic variables were significant in only the supplies and miscellaneous regressions.

Regional effects were significant in only two of the 14 equipment price regressions (clinical chemistry per test and hematology per MD). Urbanicity effects were significant in only two of the regressions (ultrasound per test and hematology per test). For *all* geographic effects, only four of the 14 regressions had significant locational effects.

Overall, the results of Table 3-5 provide little consistent evidence of geographic input price variation. However, the number of statistically significant coefficients, in twelve out of 51 regressions, is too high to ascribe to chance alone.

The univariate and multivariate analyses provide *weak* evidence that geographic input price variation *might* exist. The low number of statistically significant geographic effects, the inconsistency of results, and the poor data quality do not provide confidence that the statistical results provide strong evidence of geographic input price variation. Although the evidence for geographic input price variation is weak, it cannot be ruled out either. Better input price data obtained through primary data collection would be necessary to establish more definitively the degree of geographic price variation.

3.2.4 Correlation with Other GPCI Input Price Measures

In lieu of obtaining better, but expensive, supplies, equipment, and miscellaneous input price data, existing price indices for other inputs may be adequate to adjust physician payments. In place of the geographic dummy variables used above, the employee wage component of the current GPCI, the office rent component of the current GPCI, and the overall GPCI are alternatively used in the expenditure/price regressions. The natural logarithm of each of the GPCI variables was used; thus, the regression coefficients can be interpreted as elasticities. An elasticity of one indicates that a one percent increase in the GPCI is associated with a one percent increase in practice expense or equipment price.

The results of using GPCI components as independent variables in lieu of geographic variables are presented in Table 3-6. The positive signs of the GPCI price indices in the medical equipment purchase price regressions are inconsistent with the negative signs of the GPCI price indices in the physician expense regressions. The regression coefficients for the

TABLE 3-6

ELASTICITIES OF GPCI PRICE INDICES IN EXPENSE/PRICE REGRESSIONS

	GPCI PRICE INDEX		
Regression	**Non-Physician Employee Wages**	**Office Rent**	**Overall**
Physician Expenses			
Supply expenses per MD office visit	-0.239	-0.053	-0.156 **
Miscellaneous Expenses	-0.063	-0.061	-0.146
Equipment Expenses	-0.558 *	-0.195	-0.359
Medical Equipment Purchase Price			
X-Ray price per MD	0.037	-0.058	0.118
X-Ray price per test	0.387	0.091	0.145
EKG price per MD	0.034	0.014	0.205
EKG price per test	-0.047	0.119	0.198
Ultrasound price per MD	-0.066	-0.149	-0.027
Ultrasound price per test	0.848 *	0.121	0.634
Sigmoidoscopy price per MD	0.831 *	0.465 **	1.106 **
Sigmoidoscopy price per test	0.033	-0.009	0.106
Clinical chemistry price per MD	-0.636	-0.223	-0.652
Clinical chemistry price per test	0.725	0.573 **	0.763
Hematology price per MD	0.156	0.204	0.352
Hematology price per test	1.855 ***	0.979 ***	1.637 ***
Microbiology price per MD	-0.524	-0.003	-0.268
Microbiology price per test	-1.108	-0.468	-0.936

*Indicates statistical significance at the 10 percent level.

**Indicates statistical significance at the 5 percent level.

***Indicates statistical significance at the 1 percent level.

GPCI indices in our practice expense regressions are always negative but only statistically significant twice. In contrast, in the AMA and Urban Institute's practice expense regressions, the GPCI indices had positive signs. Thus, our findings are inconsistent with the AMA and Urban Institute findings, which are both based on AMA data.

The GPCI employee wage index is significant in three of the 14 equipment purchase price regressions (ultrasound per test, sigmoidoscopy per MD, and hematology per test). The office rental index is also significant in three of the 14 equipment regressions (with clinical chemistry per test instead of ultrasound per test). The overall GPCI is significant only in the sigmoidoscopy per MD and the hematology per test equipment purchase price regressions.

Overall, ten of the 51 practice expense and equipment purchase price regression GPCI coefficients are statistically significant - too high to be due to chance alone, but not strong enough to indicate that the GPCI components are adequate price indices for supplies, equipment, and miscellaneous prices.

3.2.5 Conclusions

This section analyzed geographic variation in supply, equipment, and miscellaneous expenses collected on HCFA's 1988 Physicians' Practice Costs and Income Survey (PPCIS). All analyses controlled for physician specialty. Supply expenses were standardized by an estimate of annual office visits. In analyzing equipment and miscellaneous expenses, we controlled only for the number of full-time equivalent physicians in the practice. Our major conclusions are:

(1) None of these three expenses vary significantly by urbanicity (rural, small metropolitan, large metropolitan).

(2) Supply and miscellaneous expenses are significantly lower in the northeast than in the other three Census regions.

(3) The overall GPCI and the nonphysician employee wage and office rental indices are generally not significantly related to supplies, equipment, and miscellaneous expenses. To the extent they are related, the correlations are negative. This finding differs markedly from the positive, significant relationship found by the Urban Institute with AMA data (Zuckerman, *et al.*, 1992). The PPCIS results suggest that expenses are higher in rural and small cities than in large cities.

We also analyzed PPCIS data on diagnostic and laboratory equipment purchase prices per FTE physician and per test performed. Seven types of equipment had sufficient sample sizes to be analyzed: X-ray, EKG, ultrasound, sigmoidoscopy, clinical chemistry, hematology, and microbiology. We found some weak evidence of geographic variation in these prices, but the patterns of variation were not consistent. Our results could be explained by random variation in the data due to our inability to control for equipment vintage and characteristics. However, we cannot rule out geographic price variation with these data. Unlike expenses, some equipment prices were significantly positively related to the GPCI price indices such as nonphysician wages.

4.0 CONCLUSIONS FOR POLICY

Given the uncertainty over actual geographic variation in supplies, equipment, and miscellaneous prices, before discussing policy options, it is useful to consider the effect of hypothethical price variation in supplies, equipment, and miscellaneous inputs on the overall Medicare Fee Schedule Geographic Adjustment Factor (GAF). These simulations are presented in Section 4.1. The conclusion of the simulations is that under any reasonable scenario for price variation, the inaccuracy in the GAF from not making an adjustment for supplies, equipment, and miscellaneous prices is very small. Policy options for the supplies, equipment, and miscellaneous component of the updated (1996) practice expense GPCI are discussed in Section 4.2. Section 4.3 concludes the report with some brief comments on strategies for primary data collection in the longer run.

4.1 Effect of Hypothetical Supplies, Equipment, and Miscellaneous Price Variation on the Geographic Adjustment Factor (GAF)

The effect of price variation in any of its components on the GAF[1] depends on the share of the input in the GAF as well as the extent of price differences. Table 4-1 shows the GAF market basket shares of supplies, equipment, miscellaneous inputs, hypothetical input price variation unweighted and weighted by each input's market basket share, and the highest and lowest index values implied by the hypothetical price variation. For example, medical supplies has a 5 percent share in the GAF. Suppose supplies prices varied from 10 percent above to 10 percent below the national average. Weighted by supplies' market basket share, the impact on the overall GAF is only from 0.5 percent above to 0.5 percent below the national average, or implies a highest index value of 1.005 and a lowest index value of 0.995.

Table 4-1 shows that hypothetical price variation in the supplies, equipment, and miscellaneous inputs probably does not have a large effect on the GAF. Even 20 percent price variation in the sum of the three categories implies only a 2.7 percent difference from the national average when weighted by the market basket share. The lack of impact is because of the small market basket shares of these inputs. Equipment has an especially small

[1]By GAF, we refer to the overall Geographic Adjustment Factor utilized in the Medicare Fee Schedule, which is a weighted sum of the physician work, practice expense, and malpractice GPCIs.

TABLE 4-1

EFFECTS ON GAF OF HYPOTHETICAL VARIATION IN SUPPLIES, EQUIPMENT, MISCELLANEOUS INPUT PRICES

GAF Component	Market Basket Share[1]	Hypothetical Price Variation[2]	Weighted by Market Basket Share	High/Low Index Values Weighted by Share[3]	
Supplies	5.0	±10 %	±0.5 %	.995	1.005
		±20	±1.0	.990	1.010
Equipment	2.4	±10	±0.2	.998	1.002
		±20	±0.5	.995	1.005
Miscellaneous	6.0	±10	±0.6	.994	1.006
		±20	±1.2	.988	1.012
Total	13.4	±10	±1.3	.987	1.013
		±20	±2.7	.973	1.027

[1]Market basket shares are in the current (1992) GAF.

[2]Relative to national average price.

[3]1.0 is the national average.

NOTE: GAF is Medicare Fee Schedule Geographic Adjustment Factor.

share, at 2.4 percent. Of course, if the actual degree of price variation is greater than assumed in Table 4-1, the effect on the GAF would be larger. However, large price variation in the continental United States seems unlikely. Supplies and equipment are products and arbitrage (i.e., transshipment of products in response to regional price differences) should limit geographic price differences unless shipping costs are very high. Some elements in the miscellaneous category (e.g., legal and accounting services) are labor-related and could exhibit greater variation. However, other miscellaneous elements (e.g., office furniture) are nonlabor inputs whose prices may not vary much geographically. Also, geographic price variation in the various miscellaneous inputs may not be highly correlated and thus, the overall price variation of the miscellaneous category may be limited. The small impact of the supplies, equipment, and miscellaneous categories on the GAF limits any inequities that may result from lack of an adjustment for these prices. Also, the relative unimportance of these categories should be considered when evaluating the desirability of expensive efforts to collect primary data on these input prices.

4.2 Policy Options

There is currently no conclusive evidence of geographic variation in the prices of supplies, equipment, and miscellaneous inputs employed by physician practices. A priori considerations and anecdotal evidence suggest that any price variation is small for most areas and inputs. Analyses of expenditure data suggest that variation may exist, but they are not entirely convincing due to the difficulty of inferring price variation from expenditure variation. No input price data exists that is adequate for making an adjustment for supplies, equipment, and miscellaneous prices in the GPCI.

Given this background, the short run policy options are:

- no adjustment;
- no adjustment for the mainland United States, but an outlier adjustment (for supplies and equipment only) for Alaska, Hawaii, and Puerto Rico based on higher shipping costs; or
- an "ad hoc" adjustment based on the coefficient of an available price index (e.g., the GPCI nonphysician employee wage index) in a regression explaining physician supplies, equipment, and/or miscellaneous expenses.

The first option maintains the status quo. As shown by the simulations in Section 4.1, any inaccuracy in the GAF resulting from lack of an adjustment is likely to be very minor. The second option would establish an add-on for outlying areas (paid for by a slight reduction in payments to all other areas), justified by higher shipping costs. This option is consistent with current policy in Medicare's Prospective Payment System (PPS) for hospitals, where an add-on for hospital nonlabor expenses is made to outlying regions. However, there is no evidence that supplies, equipment, and miscellaneous input prices of physician practices are actually higher in outlying areas. For example, many pharmaceuticals are manufactured in Puerto Rico, so shipping costs for drugs are presumably lower than to the mainland United States. The third option would base an adjustment on a regression of physician practice expenses, gathered from surveys, on available price indices. This method is consistent with the geographic adjustment for hospital capital costs in PPS, which is based on a regression of capital expenses on the PPS hospital wage index. However, the face validity of this procedure is limited, and it is difficult empirically to distinguish price variation from expenditure variation (expenditures are affected by quantities in addition to prices). Moreover, physician expenditure regressions using AMA SMS and HCFA PPCIS data are inconsistent.

With these considerations in mind, the Health Care Financing Administration decided to maintain the policy of no adjustment for supplies, equipment, and miscellaneous prices in the updated (1996) practice expense GPCI.

4.3 Primary Data Collection in the Long Run

Currently, no data are available to determine the extent of geographic variation in supplies, equipment, and miscellaneous prices. To further analyze price variation, or to develop a geographic adjustment, primary data collection is necessary. Although it may be feasible to collect such data, doing so would be expensive. Furthermore, the improvements in the accuracy of the GAF resulting from primary data collection are likely to be small, both because of the small share of supplies, equipment, and miscellaneous inputs in the GAF, and because their price variation is likely to be limited. The analysis presented in Section 4.1 indicates that the likely improvement in the GAF's accuracy for the highest and lowest priced areas would be 1 to 3 percent. For most areas, the improvement would be much smaller. Given competing budgetary priorities, it is a policy decision for HCFA whether such gains justify the cost necessary to achieve them. Gains in the accuracy of the GAF per dollar spent

may be greater for other analyses or data collection efforts. If HCFA does decide to mount a data collection effort, we believe that a survey of physicians is preferrable to a survey of suppliers or distributors.

REFERENCES

Gillis, K. D., R. A. Reynolds, and R. J. Willke. Assessing the Validity of the Geographic Practice Cost Indexes, American Medical Association, September 23, 1992.

Medical Economics, Volume 69, No. 2 (November 16, 1992).

Pope, G., K. Adamache, and J. Webb, *Geographic Variation in Hospital Nonlabor Input Prices and Expenditures*, Draft Final Report, HCFA Cooperative Agreement No. 99-C-98526/1-08, August 1992.

Welch, W.P., S. Zuckerman, and G. Pope, *The Geographic Medicare Economic Index: Alternative Approaches*, Final Report, HCFA Cooperative Agreement No. 17-C-98758/1-03, June 1989.

Zuckerman, S., *Assessment of the Accuracy of the Overhead GPCI*, Draft Final Report, HCFA Contract No. 500-89-0054/3, November 1992.

PART IV:

THE PRACTICE EXPENSE GPCI

PART IV: THE PRACTICE EXPENSE GPCI

The 1996 practice expense GPCI is the weighted sum of its three component indices--employee wages; office rents; and supplies, equipment, and miscellaneous prices--according to the following formula:

practice expense GPCI = 0.398*(employee wage index) + 0.251*(office rental index) + 0.351*(supplies, equipment, miscellaneous price index).[1]

In first three parts of this report, we identified the best options for updating the employee wage index, the office rental index, and the supplies, miscellaneous, and equipment price indices, respectively. To recapitulate:

- the updated (1996) employee wage index is based on the median hourly earnings of occupations employed in physicians' offices, as measured by a special tabulation of the 1990 Census;
- the updated office rental index is derived from the fiscal year 1994 Fair Market Rents published by the Department of Housing and Urban Development in the April 6, 1994 Federal Register; and
- the updated supplies, equipment, and miscellaneous price index is 1.000 everywhere, that is, no geographic adjustment is made for these prices.

The 1996 practice expense GPCI is weighted by practice expense relative value units or RVUs (rather than population), reflects the Office of Management and Budget's June 1993 metropolitan area redefinitions,[2] and captures county-specific wage and rent variation within large metropolitan areas (CMSAs). These are all features--in addition to its use of more recent input price data--that distinguish the updated (1996) practice expense GPCI from the current (1992) practice expense GPCI. Of these changes, the use of more recent input price

---

[1]The weights are the average shares of each of the three cost categories–employee wages; office rent; and supplies, equipment, and miscellaneous–in physician practice expenses. Cost shares for the updated (1996) GPCI are discussed in detail in a companion report (Dayhoff, Schneider, and Pope, 1994).

[2]Although the practice expense GPCI is ultimately computed for Medicare payment localities, Census and HUD tabulate the underlying wage and rental data for metropolitan areas and the nonmetropolitan parts of states before it is crosswalked to payment localities.

localities. Appendix IV-1 shows that weighting the practice expense GPCI by RVUs versus population has only a minor effect on the index values of Medicare payment localities.

Appendix IV-2 displays the 1996 practice expense GPCI, the 1996 rescaled practice expense GPCI, the 1995 rescaled practice expense GPCI, and the 1992 practice expense GPCI by Medicare payment locality. HCFA actuaries developed a multiplicative factor (1.00125) that was used to ensure that total Medicare Fee Schedule payments for practice expense are not affected by the updated practice expense GPCI. The 1996 rescaled GPCI reflects this factor. This rescaled GPCI will be used for payment beginning in 1996. The 1995 rescaled GPCI is the simple average of the 1996 rescaled GPCI and the 1992 GPCI. The 1995 rescaled GPCI will be used for payment in 1995 only.

Appendix IV-3 ranks the Medicare payment localities in order of descending difference between the 1996 rescaled practice expense GPCI and the 1992 practice expense GPCI. The changes in the practice expense GPCI index values from updating (1996 versus 1992 GPCI) are moderate. The largest increase is 12 percent, in Southwest Connecticut. Only three payment localities gain more than 10 percent. The largest loss is also 12 percent, in Peoria, Illinois. Only three localities lose more than 10 percent. The practice expense GPCI comprises 41 percent of the overall Medicare Fee Schedule Geographic Adjustment Factor (GAF). Therefore, Medicare fees for a typical service will change by less than 5 percent in any area due to updating the practice expense GPCI. Moreover, Congress has mandated a two-year transition from the 1992 to the 1996 GPCIs. The change in the 1995 transitional GPCI is only half as large as the already small difference between the 1996 and 1992 GPCIs.

CMS LIBRARY
3 8095 00014100 8